ELECTRICAL TIMES

THURSDAY
4 OCT.
1951
NINEPENCE

HENLEY

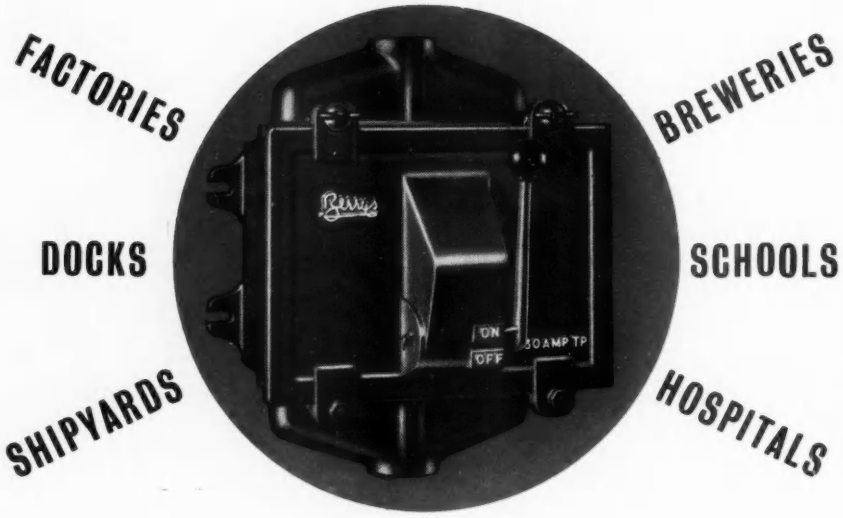
Specialists in Super-Tension Cable Technique

We are able to install complete super-tension schemes, including joints, terminations, etc., for all three of the principal underground cable systems: Gas Cushion, Oil Filled and Solid Type.

Illustrations show typical super-tension contracts carried out by HENLEY'S.

BY APPOINTMENT
ELECTRIC CABLE
MANUFACTURERS

W. T. HENLEY'S
TELEGRAPH WORKS CO. LTD.
51-53 HATTON GARDEN, LONDON, E.C.1



SWITCHGEAR for a critical engineer

All over the country, in factories, schools, industrial buildings of every kind, Berry's VIKING switchgear controls the power.

For fifty years Berry's switchgear has built its reputation on consistent high quality. It is designed to give maximum efficiency with minimum trouble to the maintenance engineers. It combines a liberal strength with remarkably clean lines, compactness with safety.

The VIKING range is wide and versatile

The following buildings, each one with widely different electrical needs, are equipped with VIKING switchgear installation. This list illustrates clearly the width and adaptability of the range:

Houses of Parliament, Royal Ordnance Factories and Aircraft Works, Ministry of Works and Ministry of Supply installations, Bristol University, Oxford Technical College, Gas Light & Coke Co., Tilbury Docks, Watney's Brewery and many other breweries.

In certain classes of installation such as Gas Works, Cold Stores, Abattoirs, etc., special measures are taken to protect the inside and outside of the apparatus from the harmful effects of gases, dust, fumes or any unusual conditions prevailing. For full particulars of VIKING switchgear, write to Berry's at the address below.

Berry's ELECTRIC LTD

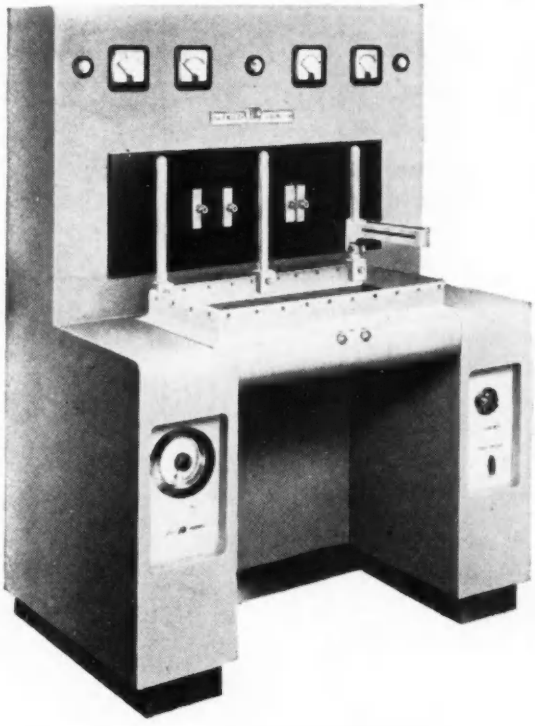
TOUCHBUTTON HOUSE,
NEWMAN STREET,
LONDON, W.1. MUSEUM 6800

MANCHESTER · NEWCASTLE · LONDON · BIRMINGHAM · EDINBURGH · EXETER

'ENGLISH ELECTRIC'

electronic heat generators

5 kW Induction Heater



The 'ENGLISH ELECTRIC' 5 kW induction heater is one of a range of electronic heat generators designed to provide maximum reliability in the now firmly established technique of electronic heating. The advantages of obtaining a uniform product, increased output and reduced costs, make this method particularly suitable for a wide range of uses including brazing, soldering, annealing, tempering and final hardening of small metal surfaces. The 'ENGLISH ELECTRIC' induction heater has been designed as a production unit, it is independent of mains fluctuations, has controllable power output, accurate repetition control, simplified loading, and comprehensive "setting up" facilities. An adaptable work sink is also fitted.

The ENGLISH ELECTRIC Company Limited

QUEENS HOUSE, KINGSWAY, LONDON, W.C.2

Industrial Electronics Department, Stafford

Works: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL

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A

FOR

- REDUCED MACHINING COSTS
- HIGH ACCURACY TO CLOSE LIMITS
- MASS PRODUCTION OF INTRICATE SHAPES
- HARDNESS & HIGH STRENGTH TO WEIGHT RATIO

HIGH PRESSURE DIECASTING

IN BRASS, GUNMETAL
ALUMINIUM BRONZE
MANGANESE BRONZE

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TELEPHONE WEST BROMWICH 1774 (5 LINES) TELEGRAMS ALCOP: PHONE · CABLEGRAMS ALCOP

Build your own equipment with

DEXION SLOTTED ANGLE

★ Can be used over and over again

★ No drilling, measuring or painting

★ Just cut it and bolt it, that's all

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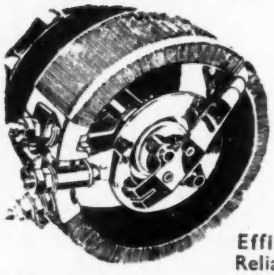
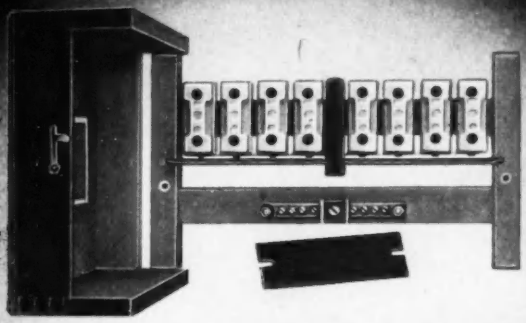


Efficient and Reliable, these instruments are second to none. Our Technical service will be happy to advise you in any difficulty, so do not hesitate to get in touch with us soon.

CRESSALL

registered Trade Name of
THE CRESSALL MANUFACTURING CO., LTD.
Tower Street, Birmingham 19
Telephone: ASTon Cross 2666 (3 lines). Telegrams: "OHMIC" Birmingham

You cannot buy better gears



"HINGELESS" HARDWOOD FUSEBOARDS.

MADE FOR 5/15, 15, 20 AND 30 AMPERES, 250 VOLTS: 1-12 WAY; DOUBLE POLE, SINGLE POLE AND NEUTRAL.

MIXED AMPERE FUSEWAYS TO SPECIAL ORDER.

ARC DAMPING TYPE FUSES (REWIRABLE).

DETACHABLE COVER FOR EASY WIRING.

REASONABLE DELIVERY FROM WORKS OR LOCAL DEPÔT STOCKS THROUGH YOUR USUAL WHOLESALER

FULLY ILLUSTRATED IN NEW CATALOGUE G 551 ON REQUEST.

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ASTON LANE · PERRY BARR
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LONDON	BIRMINGHAM.	N.MIDLANDS.	S.MIDLANDS.	N.WEST.	SOUTH	SCOTLAND
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Other people's jobs

Looking more like a man from Mars, Tom Baker works in the deafening roar of one of our Shot Blasting Chambers. The terrific blast from a jet of steel shot thoroughly cleans the iron castings for Belling cookers, producing a perfect surface for the subsequent coats of vitreous enamel. Like a diver, he is fed with fresh air through a pipe line when he is inside his solitary steel-lined cell. Tough work this — no job for a man with shaky nerves.

You can't beat a "Belling"

BELLING & CO. LTD., BRIDGE WORKS, ENFIELD, MIDDLESEX. HOWARD 1212
CRC 378

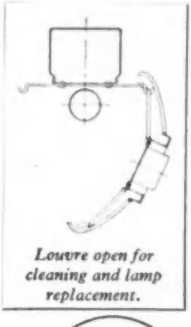
THE BRITANNIA COMMERCIAL FITTING...

WITH THESE SPECIAL FEATURES

- HINGED LOUVRE-DIFFUSER
- UNIQUE ETCHED SILVER FINISH
- SPRUNG LAMPHOLDERS
- GOOD UPWARD LIGHT

The Commercial Fitting, in common with all Britannia fittings, combines fine looks with the many technical refinements, not only for extreme simplicity of erection and maintenance but for general lighting efficiency:—

1. Direct lamp light above the horizontal.
2. Diffused light only in all zones from the horizontal to 40° below it.
3. Direct lamp light plus diffused light, in all zones lower than 40°, on to the working plane.



Louvre open for cleaning and lamp replacement.

Britannia

ONE OF BRITAIN'S LARGEST MANUFACTURERS

Fittings with features

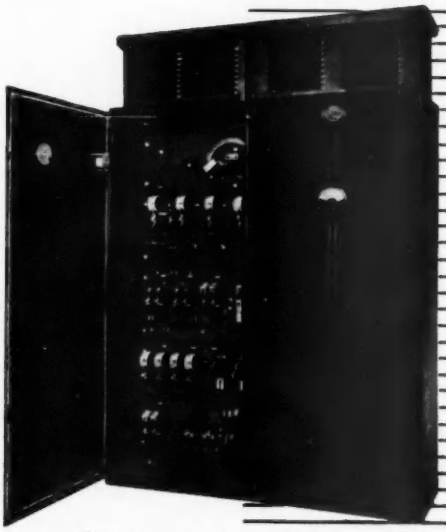
BRITANNIA ENGINEERING CO. ASHTON RD., LUTON, BEDS. LUTON 4082

B

IGRANIC
ELECTRIC CONTROL GEAR

There are qualities in the design and construction of Igranic motor control gear which make it first choice of discriminating engineers throughout this country and abroad.

Many years' experience and constant co-operation with manufacturers and users of electrically operated machinery has enabled us to produce control units which are pre-eminently suited to the specific requirements of each particular industry.



Three-motor Control Panel for large boring machine Approximate height 7-feet.

A TYPE FOR EVERY DUTY

HEAD OFFICE AND WORKS - BEDFORD

EXPORT DEPT.:—VICTORIA STATION HOUSE, 191 VICTORIA STREET, LONDON, S.W.1

ELECTRIC IGRANIC CO. LTD.

BRANCH OFFICES:—

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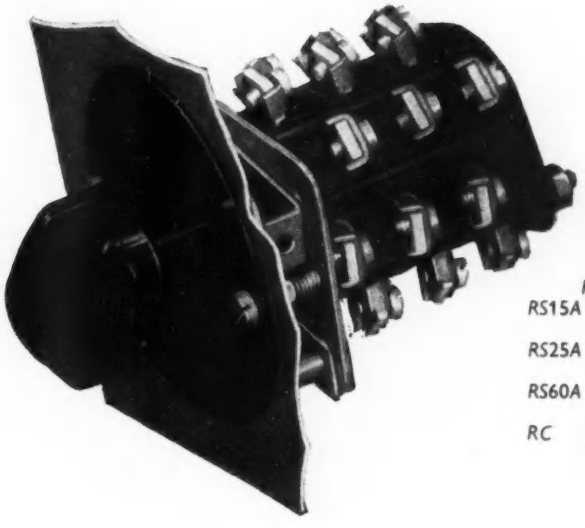
An addition to the range of 'FERGUSON PAILIN' Control Switches

RS60A RS25A RS15A

It all adds up to ADAPTABILITY



Range now consists of :

RS15A — 15 amps, 230 volts A.C. up to 6 poles.

RS25A — 25 amps, 230 volts A.C. and D.C. up to 10 poles.

RS60A — 60 amps, 230 volts A.C. and D.C. up to 4 poles.

RC — A "spring return to neutral" 3-position switch for use as an Oil Circuit-Breaker or Governor Motor Controller.

FERGUSON PAILIN 'RS' switches have been designed to facilitate remote or local control of many types of equipment.

The 'RS15A' is a selector and control switch for smaller circuits up to 15 amps at 230 volts A.C. It has been produced to supplement the types 'RS60A' and 'RS25A' switches, which have been enthusiastically received by many manufacturers of products requiring control switches, both in Great Britain and Overseas. The importance of positive make and break action has been fully realised in the design of the components, and its small space requirements on the mounting panel make it adaptable for use on many engineering and domestic products.

FERGUSON PAILIN LTD.

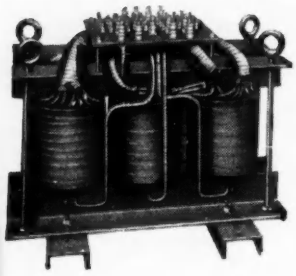
MEMBER OF THE AEI GROUP OF COMPANIES

Switchgear Specialists

MANCHESTER, 11. ENGLAND

TRANSFORMERS

From 8 V.A. to 100 k.V.A.



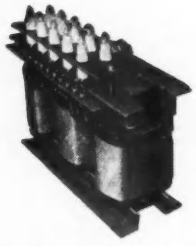
PRIMARY: 400 v. 50 cycles, 3-phase
SECONDARY: 210/550 v. Star connected 50 k.V.A.

HEAYBERD Transformers are designed to give the utmost reliability and economy in operation, fully in accordance with the relevant British Standard Specifications.

We shall be pleased to quote for open, enclosed and oil-insulated transformers to suit your particular purpose.

Write for List 1044.

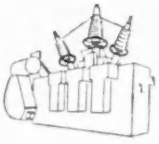
HEAYBERD

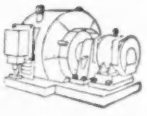


A high-voltage transformer. Primary, 400 v., 3-phase, 50 cycles. Secondary, 3,000 v. per phase.

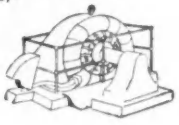
F. C HEAYBERD & CO. LTD

Head Office: GREENWICH SOUTH STREET, S.E.10. Phone: TIDeway 4646 (3 lines)
Works: Greenwich. Cables & Telegrams: "Heayberd, Green, London"



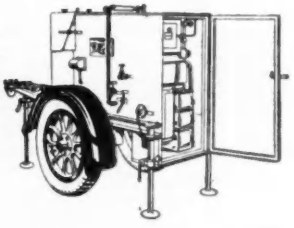


"FOR US IT IS AN ESSENTIAL SERVICE . . . ." says the power engineer



The Stream-Line Filter plant by a simple mechanical operation keeps the insulating value of oil in transformers and switchgear at over 60 k.v. It contributes materially to the reliability of our whole service.

Stream-Line Portable plants are weatherproof and automatic with capacities of 5 to 500 gallons per hour.



STREAM-LINE FILTERS LTD
HELE-SHAW WORKS · INGATE PLACE · LONDON · S.W.8

Originality

The safety of children in the home has been featured by us in advertisements since first we introduced fully interlocking switchsockets some thirty years ago. This picture is reproduced from an old catalogue. Boys will always have their share of mischief and curiosity; but ingenious electrical accessories, such as those pioneered by MK, have kept each successive generation out of harm's way. In the early thirties we introduced a switchsocket to interlock with ordinary British Standard unmutilated plugs. This design, substantially unaltered, is still in great demand — a sure tribute to originality and reliability.

MK
M.K. REGD

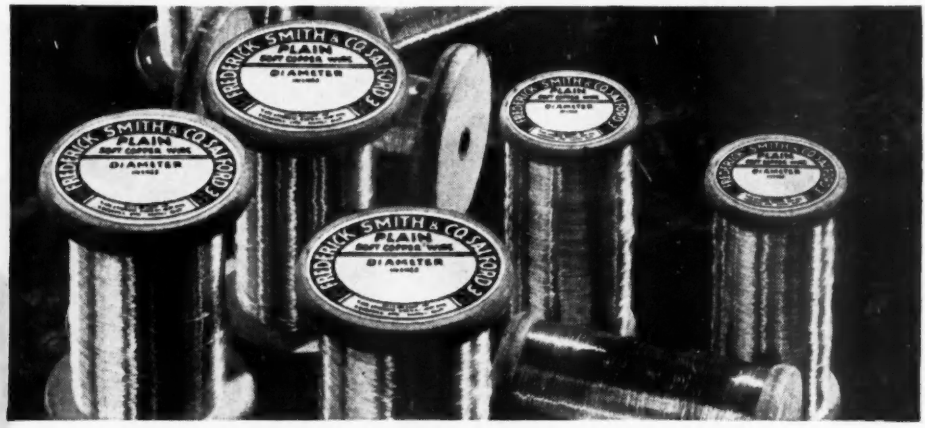
M.K. ELECTRIC LIMITED

WAKEFIELD STREET, EDMONTON, LONDON, N.18

Phone: Tottenham 5151 *Grams:* Multiconta, Southtot, London

A46

COPPER FOR ELECTRICAL PURPOSES



FINE BARE WIRES

The exceptional ductility of copper permits the drawing of wires as fine as one thousandth of an inch in diameter. These fine wires which are used in electric cables, instruments and radio parts must comply with exacting requirements. If you desire wires that are fine in all senses of the word—

FS & CO

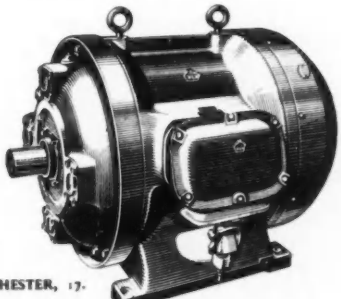
specify ANACOS REGD.

FREDERICK SMITH & COMPANY
ANACONDA WORKS SALFORD 3, LANCS
Incorporated in The London Electric Wire Company and Smiths Limited
Associated with The Liverpool Electric Cable Co. Ltd. and Vactite Wire Co. Ltd.

IN THE OIL WORLD THEY SAY ...

"That's good, it's an M-V Motor"

Oil wells and refineries throughout the world rely on M-V electrical equipment. 'Metrovick' experience of motors and their proper application covers all drives in the oil industry, from drilling to refining. Site engineers well know how M-V electrical equipment brings their complex plant into active life.



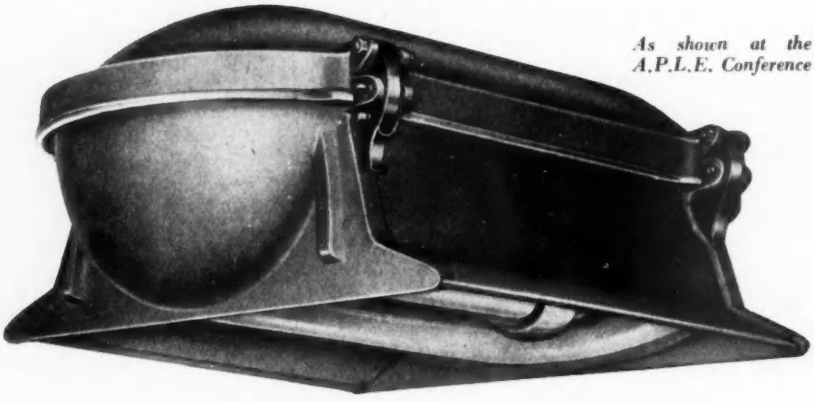
250 h.p. Type FS Motor.

METROPOLITAN-VICKERS ELECTRICAL CO. LTD., TRAFFORD PARK, MANCHESTER, 17.
Member of the A.E.I. group of companies

METROVICK *Motors for all Industrial Drives*

J/M002

The last word in CUT-OFF Street Lighting . . .



As shown at the A.P.L.E. Conference

This new Revo unit (No. C.13654) is the very latest in cut-off fittings, designed for use with 250-400w horizontally burning mercury lamps or 85-140w sodium lamps.

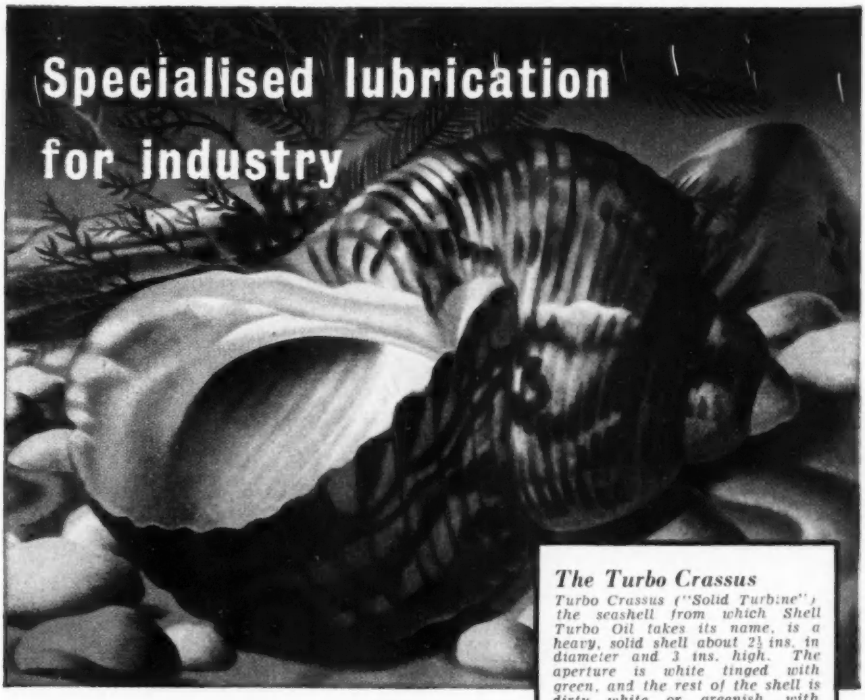
Note the following features:

- **Totally enclosed and perfectly weatherproof**
- **Ease of maintenance**
- **No light above the horizontal**
- **Side or top entry**

REVO REGD.

STREET LIGHTING EQUIPMENT

REVO ELECTRIC COMPANY LIMITED, TIPTON, STAFFS.



The Turbo Crassus

Turbo Crassus ("Solid Turbine"), the seashell from which Shell Turbo Oil takes its name, is a heavy, solid shell about 2½ ins. in diameter and 3 ins. high. The aperture is white tinged with green, and the rest of the shell is dirty white or greenish, with angular black or brown patches on the ribs. Found off the coasts of North Australia and New Caledonia.

SHELL TURBO OIL

SHELL TURBO OILS are highly refined oils containing anti-oxidant and anti-rust additives. They separate readily from water during prolonged service and have outstanding oxidation stability. Available in a range of viscosities, they are recommended for steam, gas and water turbines, bearings of high speed enclosed crankcase steam engines, and certain other circulating systems where oils of turbine quality are required. Shell Turbo Oils are approved by all the leading turbine builders.

The wide Seashell range of specialised industrial lubricants is marketed in nearly every country of the world. There is a Seashell grade for *every* industrial use—and each is available everywhere in the same high quality.

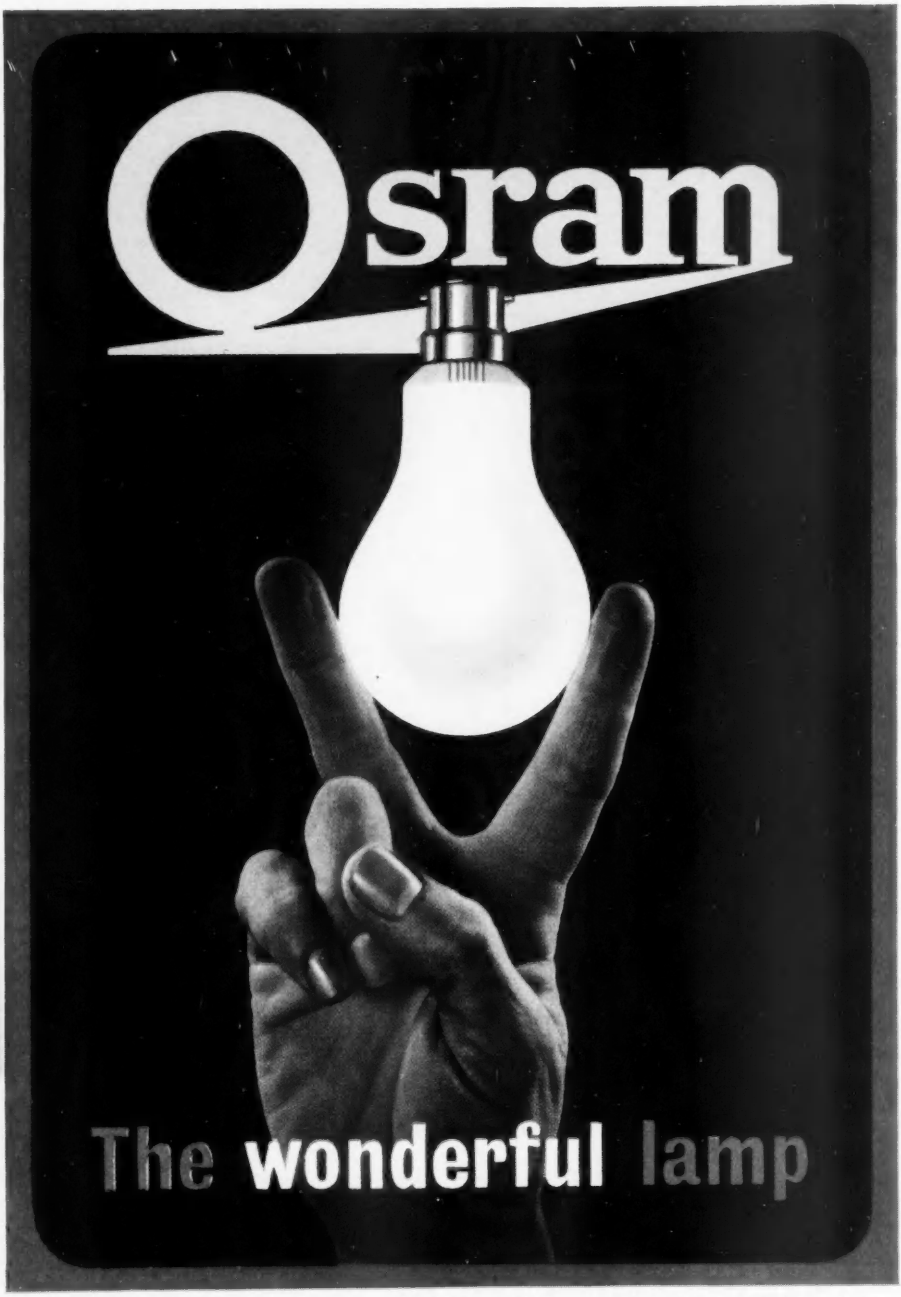
SHELL LEADERSHIP IN LUBRICATION

WORLD-WIDE INDUSTRIAL RESEARCH

Seashell Oils are produced as the result of *world-wide research*. At Shell's great Thornton Research Centre, and at other Shell Research Centres in Europe and America, scientists and technicians spend their lives studying the special lubrication needs of every branch of industry. The rewards of this research are the Seashell oils—each developed to solve a *specialised* lubrication problem. This is the solid basis upon which Shell has built up its world-wide *leadership in lubrication*.

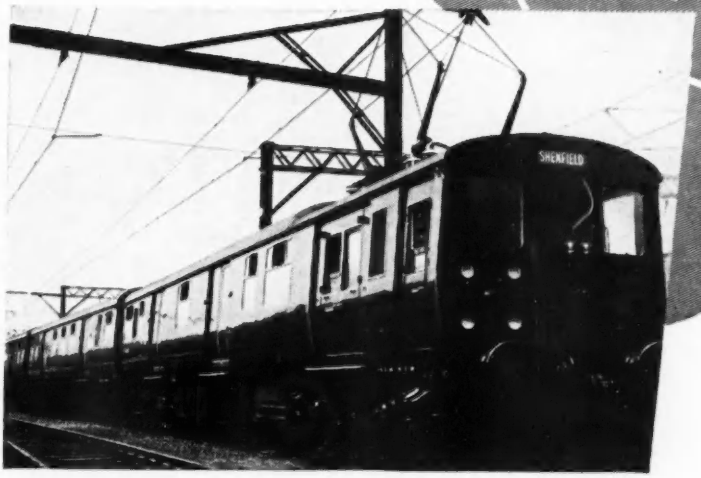
CALL IN A SHELL LUBRICATION ENGINEER

Shell Lubrication Engineers will be pleased to provide further information and to make specific recommendations for particular purposes. You can be sure of Shell lubrication—it is *specialised* lubrication.



THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

P & G BATTERIES in the public service



P & G Batteries provide many important auxiliary services to help keep Britain's electric trains running to schedule. On the new Liverpool Street to Shenfield electrification scheme, two of these are switchgear operation and supervisory control. P & G experience is spread over a very wide field and stretches back over 60 years. Specialists who know the battery business throughout will gladly discuss any projects with you. Since two heads are better than one, the results are often surprising. Our 3-point service covers **1.** *Technical Advice and Specifications.* **2.** *Equipment and installation.* **3.** *Regular inspection and report.*

2 *heads are better than* **1**

PRITCHETT & GOLD and EPS Company Ltd
50 GROSVENOR GARDENS · LONDON · SW1

PG 19

Batteries for Switch Closing, Switch Tripping, Emergency Lighting, Supervisory Control, Telephones, Supply to Auxiliaries

C

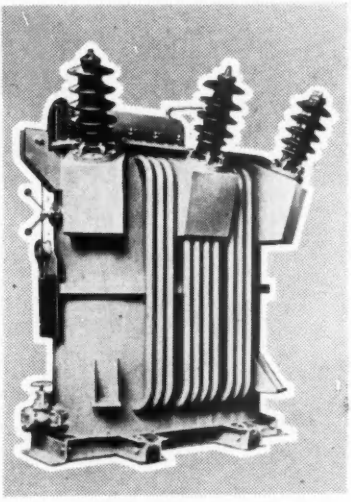
Electrical Equipment
for **INDUSTRY**

The DAVENSET trade mark has stood for utterly reliable static rectifying and transforming equipment for almost a quarter of a century.

Rectifiers for battery charging, electro plating, H.T. Precipitation and electrolytic reclamation of metal from scrap, are but a few of the many applications of DAVENSET Rectifier equipments in Industry.

These and power transformers, from the smallest to the medium sized units, for power distribution are made at Davenset Electrical Works.

From first to — LAST



PARTRIDGE, WILSON & Co. LTD.,
DAVENSET ELECTRICAL WORKS,
LEICESTER, 5.

DAVENSET

PATENT "T.A."
HEAVY DUTY LAMPHOLDER
that will reduce maintenance charges.
Operate 10 amps continuously with safety.
Manufactured by
SPERRYN & CO
MOORSOM STREET
BIRMINGHAM 6

SPECIALLY DESIGNED FOR RAILWAY CONDITIONS

THE VERITY RANGE

MOTORS
GENERATORS

CONTROL GEAR
AIR BREAK
OIL IMMERSED
HAND OPERATED
AUTOMATIC

SWITCHGEAR
SWITCHES
FUSES
SWITCHBOARDS
AIR BREAK
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FANS
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BRACKET
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SUITABLE FOR
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GAS-DISCHARGE
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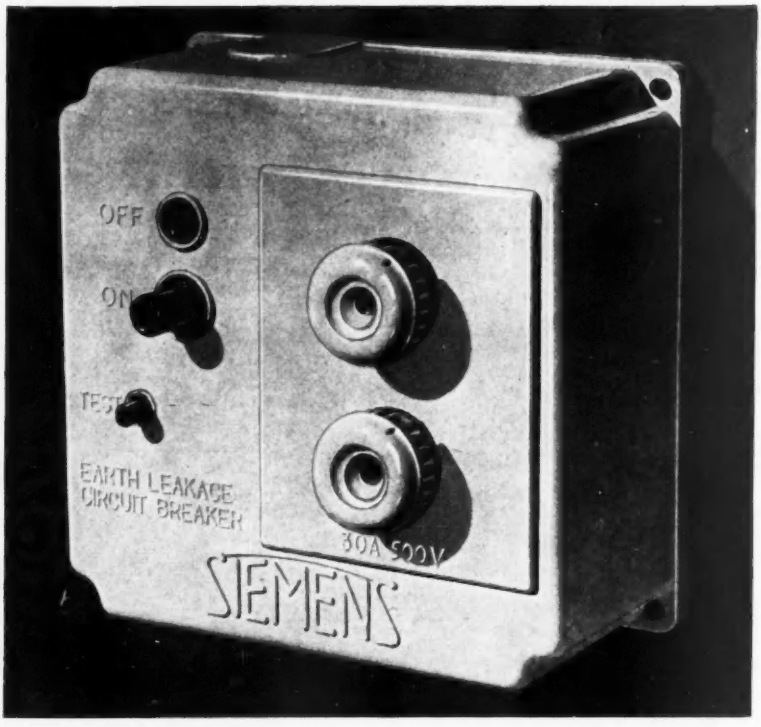
LAMPS

VERITYS Ltd.

Sales Headquarters: **BRETTENHAM HOUSE, LANCASTER PLACE, W.C.2**
Works: ASTON, BIRMINGHAM 6



SIEMENS

30 AMPS 500 VOLTS
DOUBLE POLE

Fuses are of the well-known
ZED H.R.C. TYPE

CREAM BAKELITE CASE
8" × 8" × 5" deep

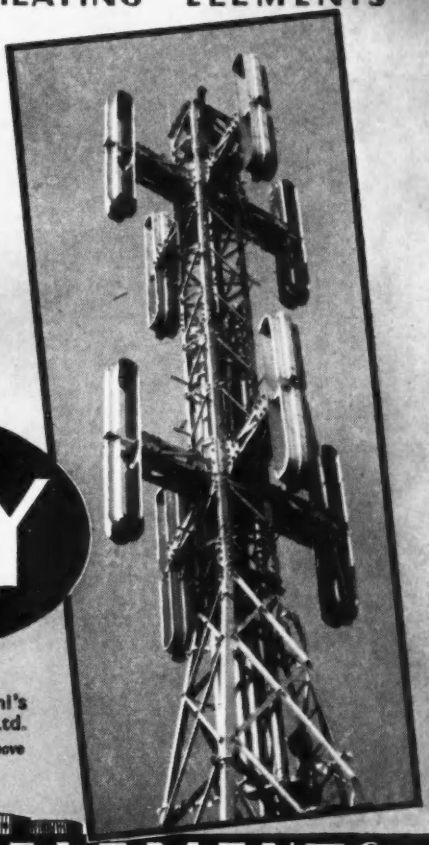
ALL-INSULATED
EARTH LEAKAGE
COMBINED
SWITCH & FUSES

Advt. of **SIEMENS ELECTRIC LAMPS AND SUPPLIES LIMITED**, 38/39 Upper Thames Street, London, E.C.4
Branches at Belfast, Birmingham, Bristol, Cardiff, Dublin, Glasgow, Leeds, Liverpool, Manchester, Newcastle-on-Tyne, Nottingham, Sheffield.

60 kW FOR DE-ICING

by BRAY TUBALOX HEATING ELEMENTS

Bray's Tubalox Elements installed and tested to satisfaction at Sutton Coldfield are now fitted at Holme Moss and are also under construction for Kirk-o-Shotts and Wenvo.



BRAY

Aerial array by Marconi's Wireless Telegraph Co. Ltd.
(Photograph by courtesy of above company)

TUBALOX ELEMENTS

UPHOLD THEIR REPUTATION IN THIS *HIGHLY* EXACTING DUTY

GEO. BRAY & CO. LTD., LEICESTER PLACE, LEEDS, 2

. . . go and get a left-handed hammer

It's forty, fifty years since some of our men learned the answer to that one. Of course, in all that time they've been learning a lot more serious things, mainly about how to co-operate in building the world's most reliable switchgear. They know it all, these old-timers. They do fine work and show others how to do it. Naturally, when a new boy turns up with brand new overalls and an eager-to-please expression, an old-timer sends him scuttling off for that unattainable hammer. But when the gentle fun is over, he says "You do it like this, sonny . . ." and another apprentice is on his way to being a good switchgear man.

REYROLLE

A. REYROLLE & CO. LTD., HEBBURN, CO. DURHAM

SWITCHGEAR

CRC 65

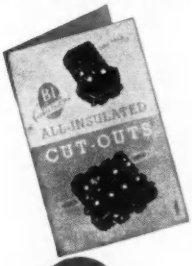
Cut-out for Rural Development

Rural development schemes, largely serviced from overhead lines or H.S.O.S. distributor cables, need specially designed cut-outs.

The B.I.C.C. range of All-Insulated Cut-Outs includes a double pole model, without sealing chamber, specifically produced for use with overhead services, and designed for convenience of installation.

They are non-ignitable, corrosion proof and made for standard dimension high-breaking capacity fuses. When fitted with B.I.C.C. "E" Type Fuse Links maximum discrimination is achieved against sub-circuit fuses.

SPECIFICATION
All-Insulated Cut-Outs are made with single or double terminals, top and bottom, and are designed to take fuse links for 15, 30 and 60 amps.



Write for Publication No.232T. It gives further information and details of types and sizes of B.I.C.C. All-Insulated Cut-Outs.

Cut-Outs and fuse links are available at all our Branches.

B.I. Callender's

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BRITISH INSULATED CALLENDER'S CABLES LIMITED
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ELECTRICAL INSULATING VARNISHES

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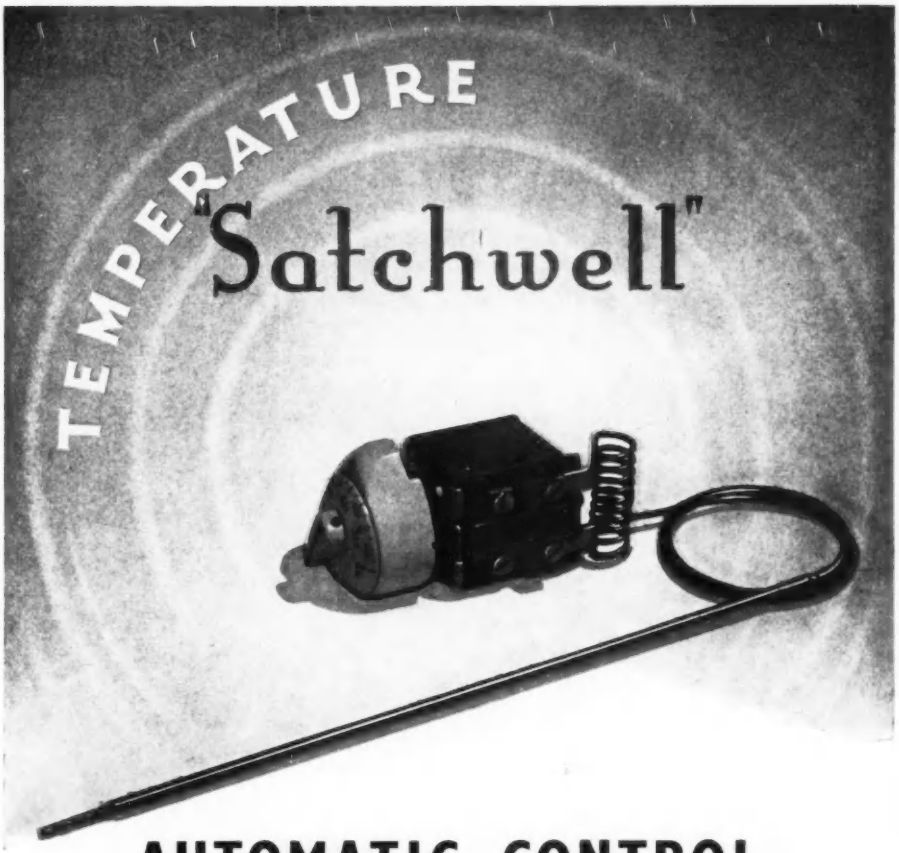

AUTOMATIC CONTROL

This picture shows one of a range of hydraulically operated electric cooker oven thermostats, type "H C S", which we have developed.

These thermostats are supplied in a number of different switch arrangements to satisfy the control demand of almost any type of domestic electric oven, and we shall be very pleased to send you a copy of list 104 which describes these instruments in detail.

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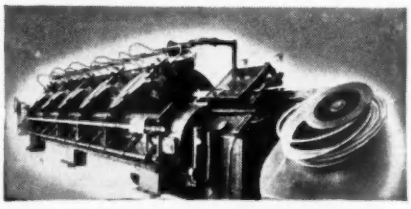

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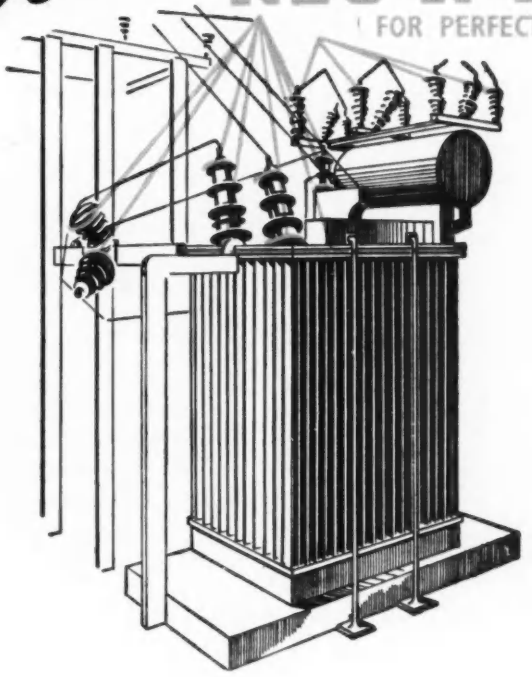

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Complete protection is afforded to three-phase and D.C. Motors up to 25 H.P. at 500 Volts against sustained faults and short-circuits, while permitting harmless temporary overloads and high starting currents.

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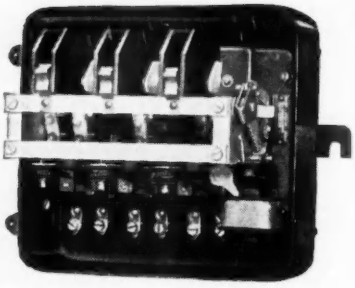

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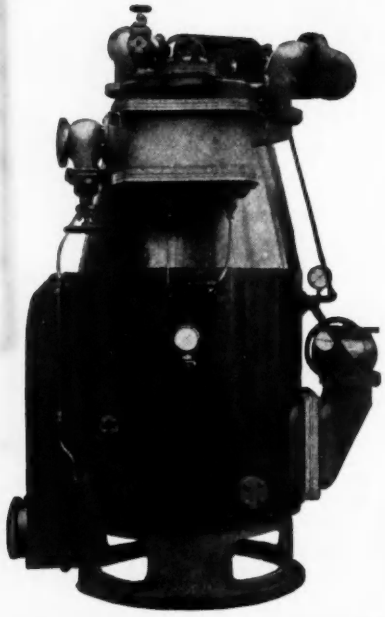
S.55



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Gases dissolved in otherwise pure feed water cause corrosion in boiler tubes, economiser tubes, turbine blades, etc., and unless eliminated can be the cause of serious and expensive troubles. The Weir "Optimum" De-aerator provides an economic and highly efficient solution to the problem by eliminating the corrosive gases, and retaining in the feed water the heat in the operating steam. Technical details and various arrangements of De-aerator fully described in Publication No. GH.37, "Eliminating Corrosion in the Power House."

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ask your moulder...

This is the third in a series of announcements designed to assist Buyers in purchasing plastics moulded articles or components.

You work to a price limit, and you wish to purchase as economically as possible. But a figure is no more than a conventional symbol. Mouldings bought 'cheaply' may prove extremely expensive; on the other hand a little additional expenditure may save many pounds in the long run.

An actual case in point is that of a large works where production was found at a standstill, the operatives sewing, knitting and reading. The Buyer explained the reason. For many years he had bought a tiny moulded component from a moulder who had given every satisfaction. The price of this component was 2½d. but a rival moulder quoted 2¼d. and the Buyer was instructed to change his supplier. When the new mouldings were issued for use, after weeks in stock, they were found not to fit.

To ensure against such hold-ups, either the customer must inspect every moulding on delivery, or the moulder must inspect it *before* delivery. Obviously the wiser plan is to choose a moulder who provides a meticulous system of inspection as a regular feature of his service. You are entitled to expect this, so do not fail to ask your prospective moulder about it. Good inspection service ensures a very low reject rate at your end and means true economy, even if the quoted price should be slightly higher than others.

The G.P.O. terminal strip embodies 45 moulded and 165 metal parts. It was assembled on a moving belt conveyor system. Every moulded component was inspected twice during assembly and the completed strip electrically tested before leaving the works. Moulding and assembly by The Streetly Manufacturing Co. Ltd. for The Engineer-in-Chief, Post Office Engineering Branch.

If in doubt, ask STREETLY

The Streetly Manufacturing Co. Ltd. makes mouldings in thermosetting and thermoplastic materials and specialises in long runs of the highest quality mouldings. A high percentage of its regular output is of mouldings for manufacturers of electrical equipment and accessories. If you have a moulding job in view, call in Streetly for practical, down-to-earth advice.

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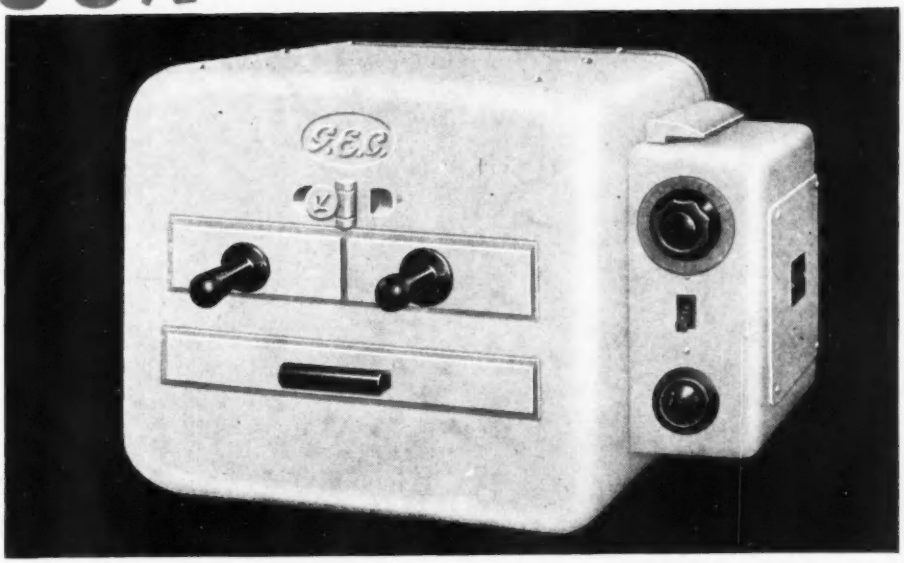

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PRICE £40

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TIME DELAY SWITCHES
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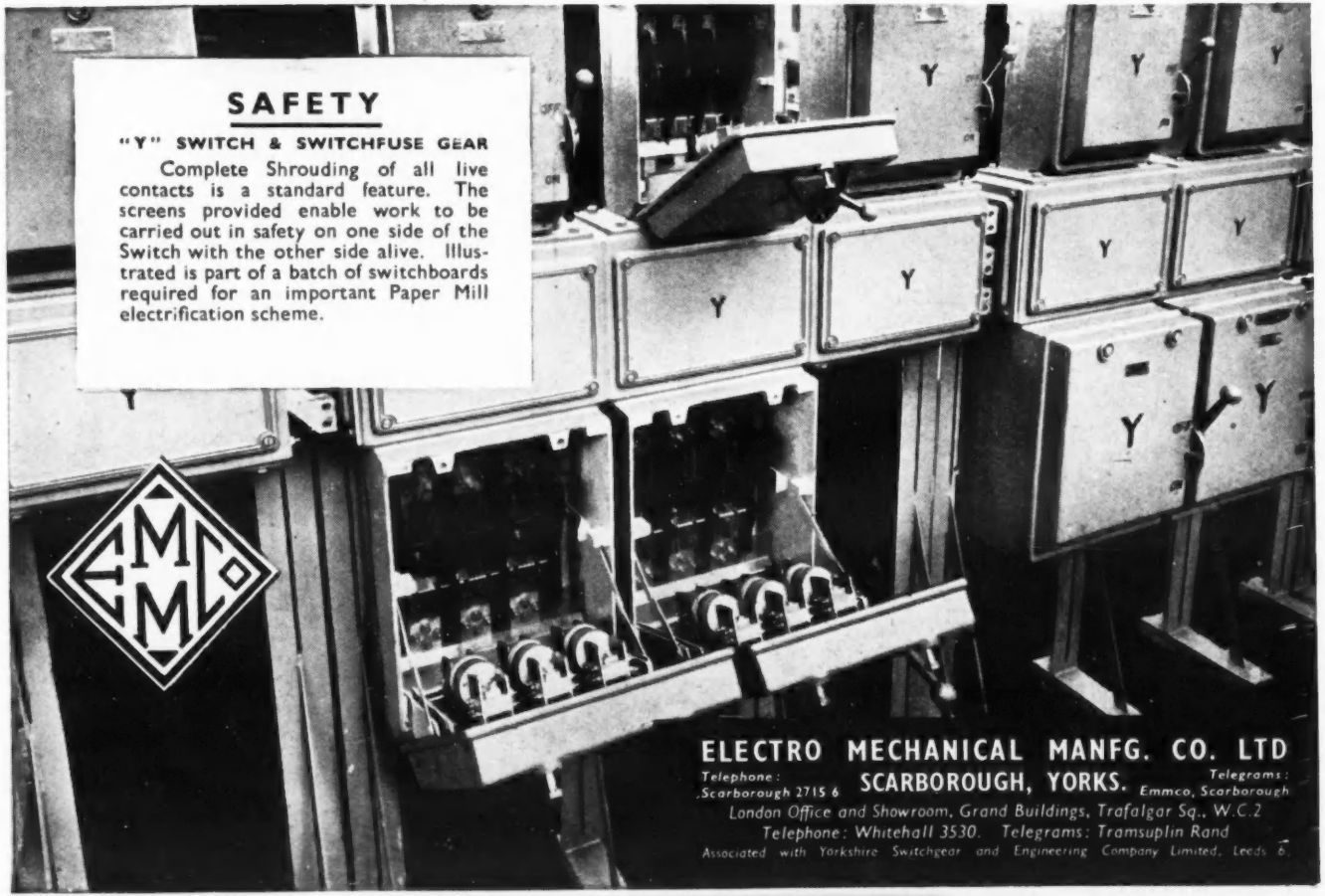
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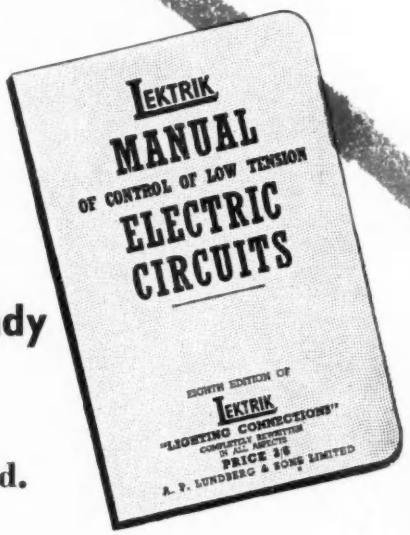

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A Domesday village where cutlery was made in the Middle Ages.

The church is over 400 years old and the cottages and Guildhall illustrated are 500 years old.

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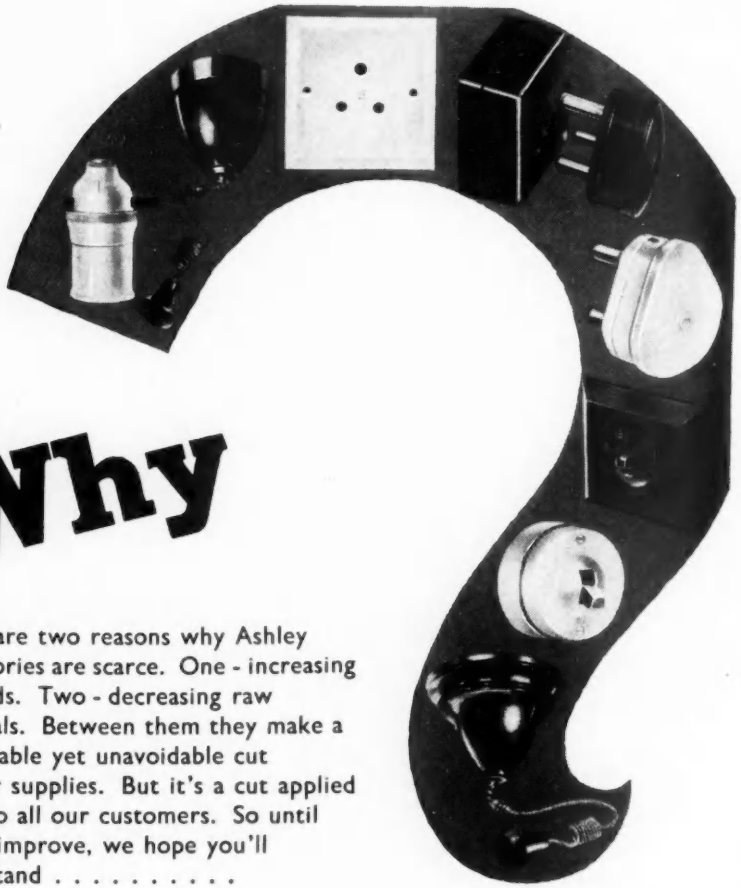

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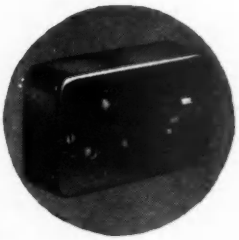
There are two reasons why Ashley Accessories are scarce. One - increasing demands. Two - decreasing raw materials. Between them they make a regrettable yet unavoidable cut in your supplies. But it's a cut applied fairly to all our customers. So until things improve, we hope you'll understand . . . . . .



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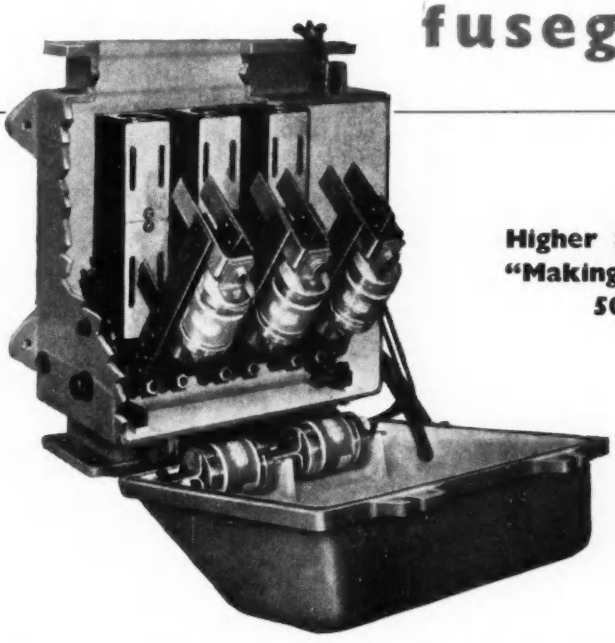
'ENGLISH ELECTRIC'

fusegear



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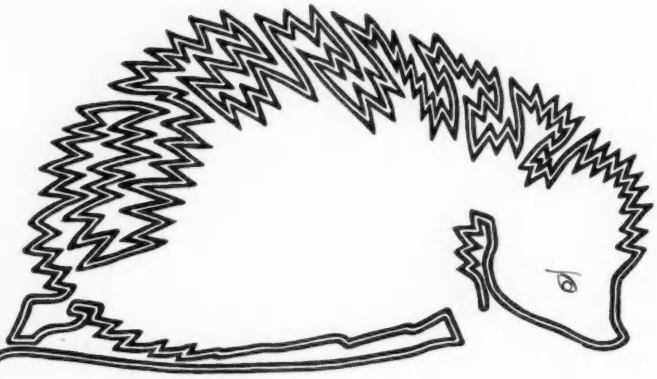
F.S



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C.5

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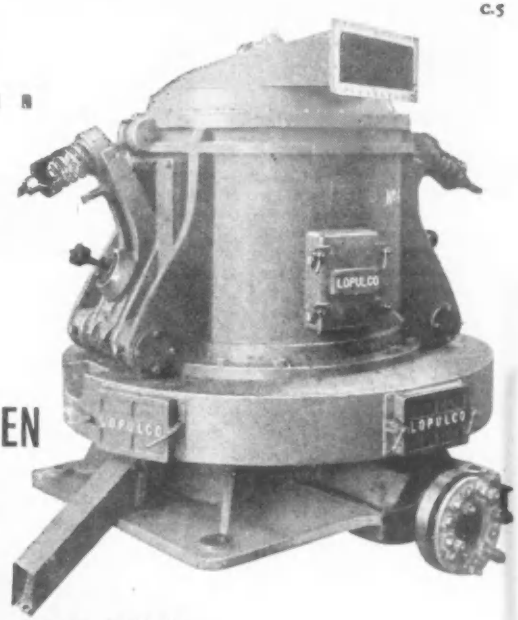
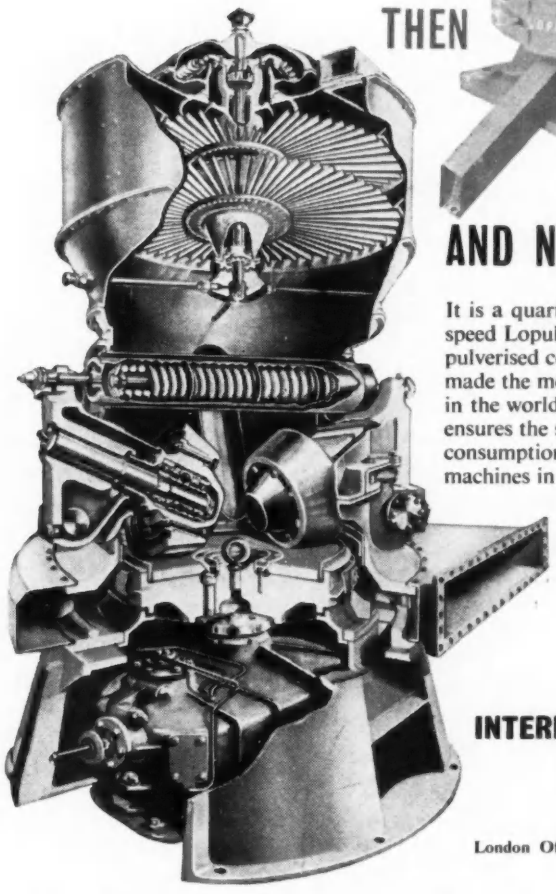
the Lopulco Mill



THEN



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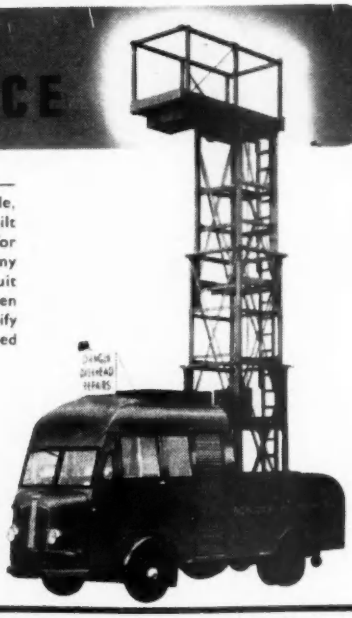

The Tower Wagon (right) is fitted with a Combined Driver's and Linesmen's Compartment with internal lockers. Towers are 3-stage with Hydraulic Elevating Gear. This Tower is supplied for lighting purposes and lamp repairs

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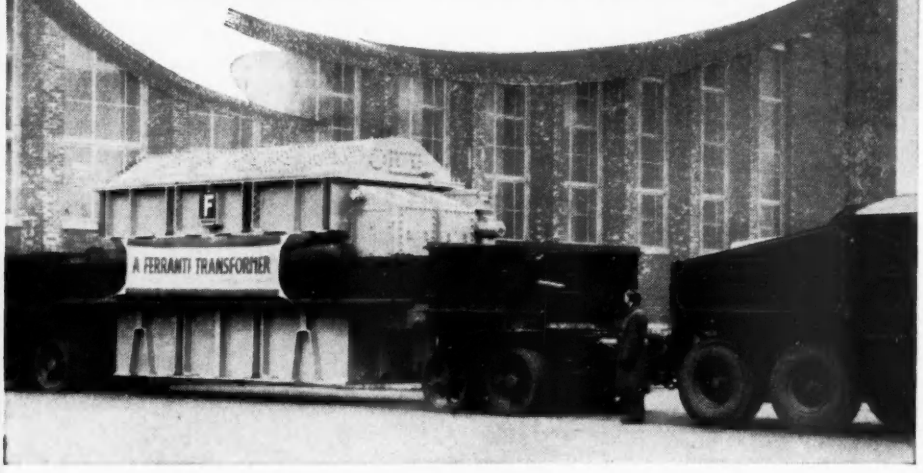

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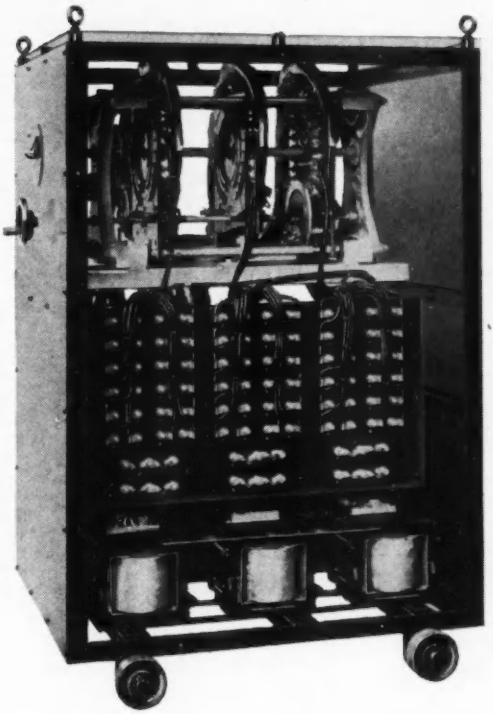

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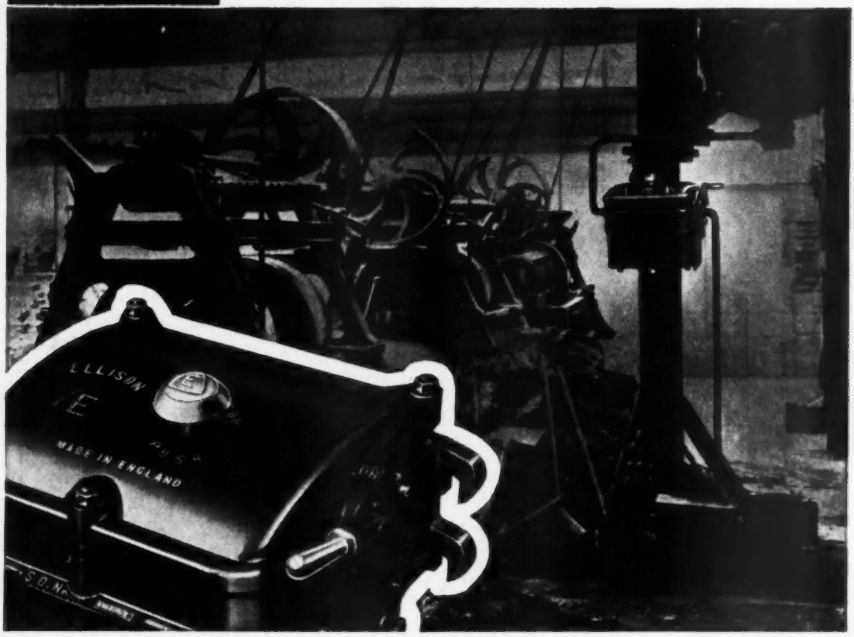

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ELECTRICAL TIMES

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SIXTIETH YEAR OF PUBLICATION

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Editorial

PLEDGING THE FUTURE

ATTEMPTS to promote electricity loads at the present time have been widely criticised in recent years, but the idea of installing wiring circuits sufficiently extensive to allow full use of electric power at some future date has not been directly attacked, though it is affected by the financial ceiling of a building licence. From the United States, however, comes news that the shortage of non-ferrous metals, and of copper in particular, has reached a point where restrictions have been placed on the use of such materials in new electrical installations. In future, wiring plans are to be vetted to ensure that minimum amounts of scarce materials are used. Where the necessary cut will come in America, that land where adequate wiring has been preached so strongly, remains to be seen. No doubt duplication for security, low current density for safety, and extra circuits for future loads, all provide the possibility of making economies. There is always the chance that this country may be forced to take similar steps in return for a share of those same scarce materials, and so some hard thinking on how a similar problem could be tackled in Great Britain will not be amiss. If the answer is ready, backed by some cogent arguments, the effect of such a new headache for the installation engineer and electrical contractor may be ameliorated, and troubles that are already distressing their American counterparts avoided.

SAFETY FIRST?

DEATH and disfigurement resulting from accidents with electric fires have been worrying responsible authorities for many years, few though such accidents are compared with the great total of fires in use. Last week, after prolonged negotiations, a British Standard was issued setting out safety requirements for such appliances. Many of its clauses are met by existing models of reputable manufacturers, but two of these sections may prove stumbling blocks which will prevent widespread production of fires conforming with the standard. Of these clauses, one concerns stability, and the other guarding. Both affect appearance, apart from price the main selling point of an electric fire, to which the usual criteria of simplicity and efficiency do not apply. The clauses covering guarding are particularly onerous in this respect, since effectively they call for wire bars not more than 2 in. apart, and an appreciable distance in front of the heating element. How industrial designers will respond to the challenge that is thus offered to them, to produce a model that is elegant while safe within the stated limits, will make an interesting study. The probable overall result will be that manufacturers will respond by adding to their list safety fires for those who appreciate them, while retaining more open models for purchasers who consider themselves above carelessness. But even if this low estimation is all that is realised, the effort of producing the standard will have been worth while, though it will be made more valuable by the promised utilitarian addendum on element dimensions.

STRESS ON CONCRETE

THE fact that the B.S.I. have issued a revised specification for concrete poles which makes no mention of the pre-stressed variety, would seem to indicate that the pre-stressed pole has not yet received wide enough acceptance, nor is the manufacturing field large enough to make such a specification necessary. As we pointed out in an article on the subject nearly two years ago, the pre-stressed pole is dearer than its older brother, although the price differential would doubtlessly be reduced with increased

demand, and the pre-stressed pole has certain advantages in requiring fewer poles per line and in reduced liability to damage during transport. The fact that the wood pole supply situation appears to have eased considerably in the last two or three years may have led to a lessening of interest in concrete pole developments. A well-tended wood pole has a very satisfactory life and gives, of course, improved performance under impulse conditions.

PRE-STRESSED TOWERS?

A NEW development in the technique might, however, enlarge the concrete pole's sphere of usefulness. Nearly a year ago, a South African author described the use of spun poles for lines up to 88 kV, with heights of 50 ft. and spans up to 2,000 ft., concluding with the view that the ideal pole would combine the techniques of spinning and pre-stressing. As we reported two weeks ago in our review of the A.P.L.E. exhibition, this combined technique has now been applied to lamp standards, so that some, at least, of the problems have been solved. On the face of it, there seems a possibility that the concrete pole might be developed for duties outside the range of applications normally envisaged with this type of material.

AGE OF EXPERIENCE

TWENTY-ONE has long included in its tradition of keys and independence, that of full journeyman's rate in trades which negotiate wage scales. This idea is firmly established; a recent arbitration award (noted elsewhere in this issue) which departs from it with reference to scientific and technical workers in the engineering industries marks a new phase in industrial bargaining. The tribunal's decision recognises that in this type of work, full technical knowledge is unlikely to be attained at 21; indeed, as recent experience has shown, formal education of some part-time description is often continued beyond this age. On this argument, an extended minimum wage scale is logical enough, but the employers opposing the claim had another worry. They specifically stated that were the extension granted, it would not be possible to confine the idea of post-21 wage scales to the skilled personnel under consideration. The arbitration tribunal apparently disagreed, and regarded the circumstances of this particular award as exceptional. It will be interesting to see who proves right, and at the same time to watch for resurgence of part of the same claim which was refused. This asked for minimum salaries for degree men and corporate members of professional institutions respectively. The claim received short shrift, with no arguments about those most interesting figures, the actual minimum salaries claimed, but a new step in that old matter of comparative awards for qualified engineers had been taken by its proposal.

CLEARING THE AIR

AT the turn of the century the London population accepted the "pea-souper" or "London Particular" with its consequent disorganisation to business and transport and its bad effects on health, as an unavoidable natural phenomenon. Today, although fogs are still with us, their texture is far lighter and their duration much shorter than that of the acrid yellow-brown miasma known to the older generation. Much of the work responsible for this pleasant change has been carried out by the National Smoke Abatement Society, although the contribution made by the introduction of electricity is by no means inconsiderable. At the Society's annual conference, many of the great coal consuming industries—with one notable exception—explained the work being done in their respective trades to minimise atmospheric pollution. Electricity, gas, coalmining, iron and steel, and cement manufacture were all represented; British Railways were not. As far as electricity was concerned, Dame Caroline Haslett pointed out that although power stations burnt over 16% of the nation's coal, they produced only 0·4% of the smoke emitted. The railways burn over 7% of the nation's fuel. We wonder what their smoke percentage figure is!

Meteor

Chemicals from Newport

Electrical Installation of Monsanto Factory is planned for Continuous Working and Automatic Control in Inflammable and Corrosive Conditions

SOUTH WALES has been chosen as the home of many new works in the past few years, several of them being described in these columns. The latest which we have had the opportunity of visiting is the Newport factory of Monsanto Chemicals, Ltd., a process plant for manufacturing chemicals from petroleum and coal tar sources which is making this country independent of overseas sources of many important commodities.

At present the 140-acre site, which lies some two miles from the centre of Newport, is only in the first stage of development, with one-quarter of the ultimate plant at present built. This has had an important effect on the arrangement of steam and electrical services, and should be borne in mind in reading this article. Some of the methods described are envisaged as temporary steps, and probable future developments are discussed in the final section.

Interesting though they are of their own right, no description of the chemical processes carried out can be attempted here. Petroleum fractions are the usual starting point, with chlorine, sulphuric acid and caustic soda as other important raw materials. The final products, for all their common chemical nature, cover a wide range of applications, and many are familiar to the electrical engineer both professionally and in his home. Examples are "Lustrex," a styrene polymer moulding compound; "Santomerse," a detergent useful in many washing powders; and the "Aroclors," a large range of substances which include types having advantages for use as heat exchange fluids and as transformer oils.

Chemical Conditions

One of the most notable features of the plant is its cleanliness: the dust and dampness so troublesome in some chemical works are absent. Most of the other difficulties that are met in the design of an electrical installation in such surroundings are, however, present. First of all, the greater part of the factory is a flameproof area, and, of course, lighting and control gear must be made safe to use in such conditions. Then there are fumes of acids and other chemicals, which can cause rapid corrosion of any metal exposed to them: and cable sheathings have to be counted amongst such metal. Benzene, with its solvent characteristics, is much used, and adds to the difficulties to be faced, especially with reference to protective coatings, whilst rubber cables may be

Four substations similar to this are fed by a radial system at 11 kV

attacked by hydrocarbon oils that are present.

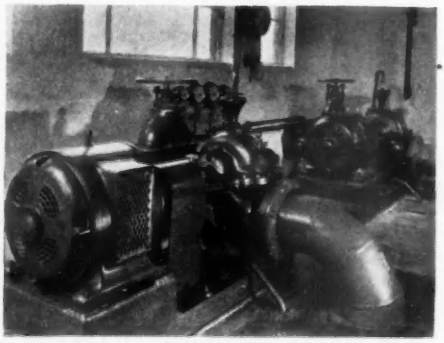
In this environment, plant must work for long periods without shut-down, for many of the processes are continuous, some for weeks at a time and some for periods of up to 48 hours where batch methods are used. During running, loads remain fairly constant, so that a good load factor can be placed to the asset side of the plant's characteristics. As is usual in chemical plants, a considerable amount of process steam is required, and ultimately this will be obtained from pass-out turbines, but this stage has not yet been reached. For the present therefore, full reliance has to be placed on the public supply, which is brought to the factory by two 0·2 sq in. 11 kV feeders from a South Wales Electricity Board substation.

Main Distribution

When completed, this substation, which is housed in a corner of the works, will control two 33 kV/11 kV 15 MVA transformers with room for a third. Forced air cooling will raise the rating of the transformers by one-third so an ultimate factory load of 60 MVA is catered for. At present, a temporary metering board is installed in the substation, and the feeders to it are being operated at 11 kV.

Main distribution within the works is operated as a radial system. The central substation houses a single busbar Crompton Parkinson switchboard, with circuit-breakers of 250 MVA breaking capacity. From this, four feeders go to substations located around the works. The busbar is operated in two sections, with the coupler normally kept open. Cables are at present run underground between this main substation and the four satellites, and it is interesting to note that these cables, originally rated for 6 kV, are now being operated at 11 kV. The change-over was necessitated by a change in supply voltage, and their suitability for the higher voltage was checked by applying a d.c. pressure test. Opportunity was taken during this period to bring the phasing of all transformers to the standard system.

At the works substation, the cable from the central sub is jointed solidly to a busbar from which an appropriate number of 500 kVA 11 kV/415 V transformers are fed through Crompton Parkinson o.c.b.s. The secondary sides of these transformers are connected through air-break isolators to a medium voltage busbar, from which subcircuits are run through English Electric switch-fuses. Transformers with 5% reactance are used, so that the short-circuit capacity on the medium voltage side is within the usual 25 MVA limit when three transformers in parallel are used; this after allowing for impedance on the h.t. side. This fault MVA consideration implies the avoidance of ring main operation, and of interconnection between substations.



These Crompton Parkinson motors drive pumps feeding a reinforced concrete cooling tower

Stand-by supply arrangements are in existence for the boiler house, so that steam pressure may be kept up should a supply interruption be experienced. For this purpose, a diesel-driven alternator is installed; otherwise the plant has no stand-by generating plant at present. Capacitors are being installed at the substations to give power factor improve-

ment. Since there are few large motors (above 100 h.p.) in the plant, the alternative of using synchronous induction motors is uneconomic. For the same reason, there is little advantage in putting capacitors near individual motors, and they are therefore concentrated in sub-stations. Eventually some 750 kVAr of capacitor correction is to be installed for the present section of the plant.

Secondary Distribution

As has been mentioned, two special conditions have to be met as regards secondary distribution—flameproof requirements and corrosive conditions. Of the various solutions possible for dealing with the first of these, the use of Pyrotenax cabling and the concentration of control gear in ventilated control rooms has been adopted.

M.i.c.c. cabling has some obvious advantages over v.r.i. in conduit in "flameproof" conditions, especially as the occurrence of small fires from time to time is difficult to avoid. It is run in the works on racks of expanded metal or on cleats. The former method is being found in practice to have the disadvantage of encouraging the collection by condensation of corrosive liquids between cable and tray wherever there is a change of direction in the vertical plane.

Trouble has been experienced with Pyrotenax where corrosive conditions are particularly arduous, and a solution has been found in the covering of the copper sheathing with a relatively thin layer—about 40 mils—of p.v.c. A difficulty experienced here was that of securing the cables, with due regard for the thermoplastic nature of p.v.c. Once again, an answer was found, this time in the use of clamps lined with steam gland packing.

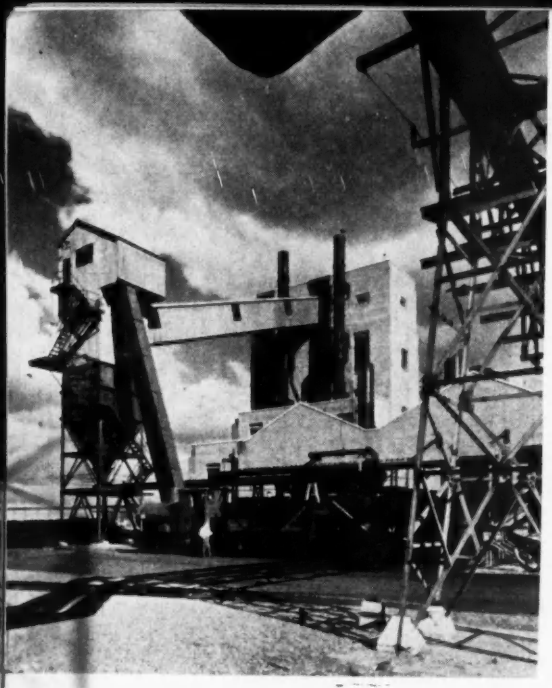
Motor starters are all of Allen West design, with the advantages of standardisation in mind, and they are housed on racks in separately ventilated control rooms. Direct-on starting is usual, and the gear is air-break. At the motor stations themselves, flameproof stop-start control buttons are installed. Direct-on starters are used in preference to star-delta for the large number of squirrel cage motors involved, both because the system can stand the initial starting currents, and also because the heavy current rush on change-over from star to delta running has been found to give trouble on some motors when it has been applied.

At the motor control rooms, p.i.l.c., s.w.a. cables run underground, are brought up to English Electric fuse gear and switches. A feature of the control gear rooms is the continuance of a 1 in. copper tape round the whole of the room, and the bonding to this of all frames, etc. It is of interest to note that the factory site is near to the estuary of the River Usk, and approximately at sea level, so that there is little difficulty in obtaining a good, low, earth electrode resistance. Values found in practice are between 0·1 and 0·2 ohms.

At the motors themselves, vibrating troubles with cable connections are avoided in one of two ways. Either the Pyrotenax is brought out of the floor gland into a large single loop before entering the motor connection box, or else it is finished at a connecting box, and the final connection to the motor made by v.r.i. cables run in flexible metal conduit. In this latter case, a bonding wire is always run from the copper covering to the motor frame to ensure efficient earthing.

Lighting presents various problems throughout the works, flameproof fittings of course being necessary. Although tungsten lamps are in general use for shop lighting, some experi-

The cooling tower pump motors seen on the left are amongst the few machines for which star-delta starting is used. On the right is another view of pump motors and switchgear, this time in the treated effluent pump house. The fusegear here is typical of the whole installation



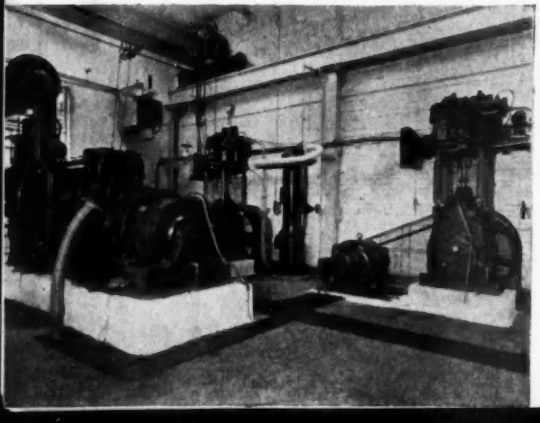
First stage of the new boiler house in this view backs the temporary building from which steam for many process purposes was supplied

mental flameproof fluorescent designs have been tried, and these are considered very promising, giving the greater light output for a given power with far simpler wiring arrangements. For street lighting purposes, mercury vapour lamps are installed, with 250 V units for the principal roads in the factory. Control for this circuit is centred at the main substation building, where contactor panels are installed.

Brine Plant

As has already been mentioned, chlorine and sodium hydroxide are amongst the raw materials used at Newport, and these are manufactured on site by the electrolysis of a brine solution. At present, large slow speed diesel engines driving generators are used to give the low voltage heavy current supply needed for the mercury cell technique used, but these will be replaced later by mercury arc rectifiers.

The diesel powered standby generator in the foreground provides an emergency supply for the boiler auxiliaries. Behind it is the air compressor which supplies many instruments



Within the brine plant, hydrochloric acid is the principal corrosive hazard to be faced. For this reason, the normal rule of Pyrotenax for cabling is abandoned, and c.t.s. cable is substituted. Another change is to the use of special corrosion-proof fluorescent fittings over the mercury cells. These fittings are silver-plated at all contacts and are compound filled.

Maintenance

For maintenance purposes, the works are split up into two sections. In each, there is a chargehand electrician with four maintenance electricians to assist him. In addition, shift electricians are always on duty for emergency work. The maintenance electricians carry out a continuous general check on all machines in their area, and about once every four months they give motors and control gear a thorough inspection, covering air gaps, bearings, dashpots contacts, etc. The fact that most motors are duplicated to ensure continuous working is of great assistance in this respect.

The many instruments installed in the works, some of which are electrically operated, are the responsibility of an instrument engineer who has his own foreman and instrument mechanics working under him, and so they are of no direct concern to the electrical staff.

Intended Changes

As was stated near the beginning of this article, many changes are still to come at Newport, and the most important of these relates to steam raising and factory generation. Steam is to be generated in a large boiler house with an ultimate capacity of eight 50 klb/hr Stirling water-tube boilers with steam conditions at the boiler stop valve of 660 lb/sq in. gauge, 710° F. Initial installation is to be two boilers. Process steam requirements have been arranged for standard pressures of 450, 150 and 75 lb/sq in. Back pressure turbines with stop valve conditions 650 lb/sq in. 700° F. will accept up to 70 klb/hr of steam and pass out at 85 lb/sq in., giving the nominal 75 lb/sq in. at the plants. Up to 14 klb/hr will be passed out at 165 lb/sq in. for a nominal 150 lb/sq in. at the plants. Process steam at

450 lb/sq in. will be obtained from the 650 lb/sq in. range via reducing valves and desuperheaters. It is not needed in the same quantities as steam at the other pressures. Should the turbine shut down, similar desuperheaters will take over the supply of all steam.

Two 75 klb/hr feed pumps will supply the boilers with water at 220° F. These Harland Engineering machines will be powered by electric motors, with a steam turbine driven pump as standby. Ion exchange water treatment is to be used, with Hick Hargreaves deaerators. About 50% of the condensate will be returned from the process plants, and the other 50% will be treated town's water.

The turbines mentioned will drive 2·5 MW alternators, the first of which is expected to be in operation in 1954. Up to two of these alternators may be operated in parallel with the South Wales Electricity Board network. As the ultimate capacity of the station is probably five, a double busbar switchgear system will have to be installed, to enable part of the works to run separately from the Board network. Switches from the existing single busbar board will be used to replace the Crompton Parkinson T.A.P. switches at present used in the 11 kV/415 V substations.

At present two 18 klb/hr Paxman double pass Economic boilers, chain grate fired, supplement boilers in the temporary boiler house. These former boilers will be retained as part of the final set-up to balance steam production between 150 and 75 lb/sq in. ranges.

Changes in the electrical distribution system will include the running of lead-covered cables on gantries and cable ladders above the ground, to reduce corrosion troubles, and the replacement of the heavier fuse gear (say above 250 amps) with circuit-breakers, to give more sensitive earth fault protection.

Today's Magnetic Materials

THAT topical subject, the shortage of non-ferrous metals, formed the background of the Chairman's address presented to the N.W. Centre, I.E.E., on Tuesday by Mr. G. R. POLGREEN, M.B.E., B.SC. (ENG.), M.I.E.E. The particular aspect with which he dealt was magnetic alloys, and the way in which recent technical advances have been reflected in practical designs.

He first discussed the restriction of eddy current losses, normally by laminating the magnetic iron. Where toroidal rings are concerned, transverse subdivision is usual, though concentric subdivision gives the same effect, and has some advantages where cold rolled steels with high directional properties. This material is formed as a continuous strip and wound into a spiral, C-shaped coils with ground fans being cut to facilitate the fitting of coils. Radial subdivision is of relatively little interest.

Where magnetic material in powder form is used, all three types of subdivision are effectively combined. Most of the insulation is in parallel with the magnetic flux, slightly reducing the saturation flux density, whilst some is at right angles and acts as a uniformly spaced air gap. Thus the permeability depends more on the insulating material than on the permeability of the magnetic material itself.

During the war, ferrites were developed in Holland using mixed oxides. These materials have mechanical properties of a ceramic nature, being extremely hard and brittle. After firing, magnets produced from them have to be ground to size, but in this way complete magnetic cores with minimum leakage fields can be produced. Permeabilities of over 1,000 with specific resistances some millions of times greater than pure iron are possible. In different grades, ferrites can be used for h.f. telecommunications and for permanent magnets.

Another new technique developed during the the war, this time in France, was that of producing sintered magnetic material from iron particles whose order of size was close to that of the actual magnetic domains. Iron-cobalt magnets with properties similar to alnico have been obtained, while using another grade of powder made from pure iron, gives an energy factor of two-thirds that for the alloy powder magnet; it is the first type of metallic magnet that has been made without an alloy containing an expensive metal, and is thus specially valuable at the present time.

At the same time that these techniques have been developed, great progress has been made in the field of insulating materials. Superenamel, as used for wire insulation, mixed in as 2% by weight of an iron powder, ensures that every particle will be coated with a strong insulating film, a few millionths of an inch thick.

In the latter part of his paper, Mr. Polgreen discussed new designs and applications that these advances made possible.

Important Standards

Three Recent B.S.I. Publications of Special Interest

THREE specifications of more than usual importance have been issued recently by the B.S.I. One, dealing with safety requirements for electric fires (B.S. 1670) is new; the other two, which are concerned with reinforced concrete poles for electrical transmission and traction systems (B.S. 607) and with steam turbines (B.S. 132) are revisions of former documents.

In the foreword to the new standard, it is made clear that the aim is the establishment of a minimum standard of safety for electric fires, together with satisfactory mechanical and electrical construction. Dimensional standardisation of elements for electric fires remains under discussion, though an amendment to the specification setting out dimensional requirements is promised "in due course." It should be emphasised here that fires for use by fit adults are dealt with: they are not necessarily suitable for unattended young children, or aged or infirm people.

There are several requirements as regards switches, including one that where switches are provided on a portable fire, they must be so arranged that one portion of the element, or alternatively a lamp incorporated in the fire, is not controlled by such a switch. Fires designed for wall mounting at a high level are to be operated by a non-conducting cord or rod.

Safety Requirements

Fires are to be stable, and the flexible cord entry arranged so that when a horizontal pull is applied, the fire will not overturn. Heating elements are to be provided with robust metal guards, which for reflector fires are to be placed not less than 1 in. from the element, and for fire-bar fires, shall be $1\frac{1}{2}$ in. away from the shoulder of the element. Tests laid down for compliance with these requirements include placing on a plane at 15° to the horizontal (fire shall not fall forward) and at 10° to the horizontal (not fall backwards), 15 lb pull on the flexible cord for one minute (no movement in the cord anchorage), and access tests through the guard with a pointed shaft 30 mm. wide at base (1·2 in.), 80 mm. (3·2 in.) long, which must not be able to touch the element. Effectively, meshes in the guard must also not pass a 50 mm. dia. (2 in.) disc.

Effectiveness is also tested by holding dry flannelette against the guard for 10 seconds. There must be no smouldering or ignition. The guard must also withstand a 5 lb weight applied to a 4 in. disc midway between support points, without decreasing the element-guard clearance by more than 15%, and without producing permanent distortion of the guard.

Turbines

Steam turbines were last the subject of a British Standard in 1930, but in spite of this comparatively few changes have been made to the document in this revision. The main difference noticeable concerns additions, referring to supervisory instruments, operational requirements in respect of high steam pressures and temperature, and precautions to be taken with larger turbines when vacuum falls rapidly.

B.S. 132. RECOMMENDED RATINGS AND STEAM CONDITIONS

Continuous maximum rating MW	Pressure at t.s.v. lb/sq in. g.	Steam temp. at t.s.v. °F.	Max. feed, water temp. °F.	Number of extraction points
10	400	800	300	3 or 4
20	400	800	300	3 or 4
	600	850	335	4 or 5
30	600	850	335	4 or 5
60	900	900	375	5 or 6
100	1,500	1,050	410	6

All feed temperatures ± 10° F. Nominal figures for vacuum, 0·49 lb/sq in. (1 in. mercury) absolute or 0·93 lb/sq in. (1·9 in. mercury) absolute at most economical output.

An appendix has been added to the standard, setting out recommended ratings and steam pressures, and this is reproduced here.

Concrete Poles

In the case of B.S. 607, changes have been made to clarify the design requirements and test procedure. It is now required that poles shall not fail owing to failure of the concrete on the compression side. Further, the purchaser is now required to state either the ultimate load, or the working load and the factor of safety required.

Materials are specified as in the previous edition, and so are some constructional details. There is a new requirement, however, that where main reinforcement rods are not continuous or not welded at all joints, a length of 7/·086 in. dia. annealed copper cable shall be embedded in the concrete, and the ends left projecting from the pole at specified points.

All three British Standards can be obtained from the B.S.I. Sales Dept., 24 Victoria Street, London S.W.1. The price is 2s. for each document.

Our readers' views . . .

Working Life?

THE life of an incandescent lamp, nominally 1,000 hours or six weeks, is accepted as satisfactory, and considering the high filament working temperature its performance is very good. One manufacturer of induction motors guarantees his motors for ever, vide constant advertisements, and although the induction motor is naturally more robust than is a commutator machine, commercial machines such as traction motors and rotary converters often work for some 18 hours per day for 20 years or more. It is therefore surprising to me to find a poor performance for a vacuum cleaner, where, although the overall life exceeded 20 years, this is really a shelf life. My own machine has been in use over this period for an average of not more than one hour per week and less than 50 weeks per year. Owner driven. This works out at not more than 1,000 hours or six weeks, and in my opinion this is a poor life, especially as the machine has previously been to the maker's twice for overhaul. On returning it recently it was reported as completely worn out and nothing could be done for it.

An offer was later made to rebuild it, but surely such performance ought not to be regarded as normal and inevitable by the maker? Does a vacuum cleaner really work under bad conditions? The dust and grit in its air system should not be allowed to enter the motor, so why should conditions be considered arduous? I have advocated domestic electrification for years, but it is not good for electrical performance to be so poor in some cases, especially as most domestic appliances, including cookers and heaters, have a very good running life.

E. H. W. Banner

BEXLEY — Consulting Engineer

Sodium Lighting

I HAVE been interested in the modern trend of road lighting more as a motorist than as an electrical engineer; as the former, I favour sodium lighting in spite of my engineering outlook, which tells me that the whiter light from mercury vapour and fluorescent lamps should give clearer illumination.

The phrase in your editorial, dated September 20, puts these contrasting feelings in a very concise way when you say of the Public Lighting Conference at Brighton that a visual inspection is likely to prove of more practical value in settling arguments than "all the photographs and polar diagrams in the world."

I have found without exception and under all weather conditions that sodium street lighting, whether main or subsidiary roads, gives far greater clarity of illumination than any other form of artificial lighting and yet the light of the former appears to be dim in comparison. I had not driven along Purley Way, Croydon, until recently, since some years before the war and I was staggered by the ease offered and safety of the sodium lighting, which I believe has been there since the road was built. I found that a road speed of 40 to 45 miles per hour was quite reasonable in the de-restricted area with the use of side lamps only. Although I invariably drive without dark glasses even in the most brilliant sunshine, I find the modern mercury vapour type of street lighting dazzling and, in rain and fog, most bewildering, which a photograph through the camera lens does not register.

I believe that the criterion of good street lighting—especially from the motorist's point of view and for general safety—is to obtain maximum light at the road level with the minimum glare from the light source and that ratio as high as possible would determine far more truly the suitability of any given lighting system than "all the photographs and polar diagrams in the world."

S. J. M. Beale

WATFORD — A.M.I.E.E., A.I.I.A., M.Inst.P.I.

"Transparent Dashpots"

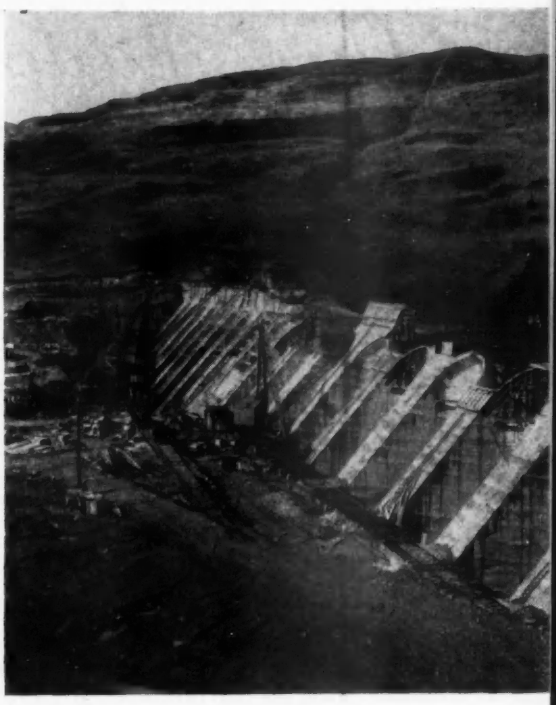
I WAS most interested to read "Solenoid's" notes on motor starters in "Problems and Practice" section of your September 20 edition. In particular, I am sure that "Solenoid's" wish for transparent overload dashpots will find many supporters. He will certainly be pleased to know that my firm is actively developing a transparent dashpot, for which, incidentally, a patent has been applied.

A. C. Gascoine

WATFORD ELECTRIC & MANUFACTURING CO. LTD. — Director & Secretary

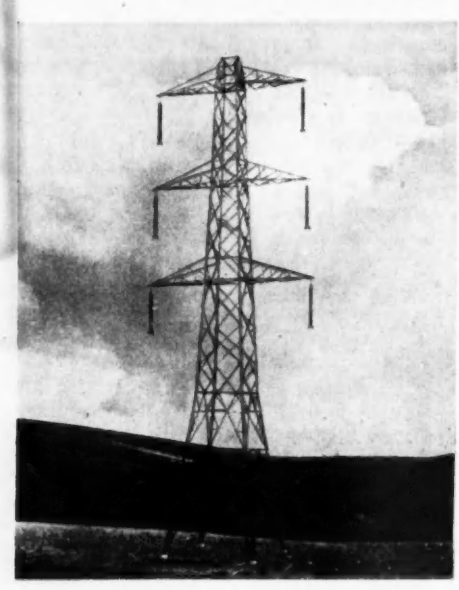
Another Hydro Scheme

ANOTHER of the North of Scotland Hydro-Electric Board's projects was formally put into operation on Wednesday of last week. It is the Cowall hydro-electric project (No. 4 Constructional Scheme), the power station of which has been erected on the shores of Loch Striven. The station has a capacity of 6,000 kW, made up of two 3,000 kW horizontal Francis sets supplied by the Harland Engineering Co., operating on a gross head of 400 feet. It is expected that an average of 13,500,000 units annually will be generated for use in the Cowal district of Argyll, Bute, Arran and Cumbrae. The scheme consists of a storage reservoir formed between the two dams in Glen Tarsan from which water will be drawn by a concrete lined rock tunnel through an intervening hillside and a high pressure steel pipe line to the generating station at sea level beside Loch Striven. At the formal ceremony last week, when Mrs. M'Glashan, wife of Mr. G. T. M'Glashan, a member of the Board, put the turbines into operation, Mr. T. Johnston, the Board's chairman, referred to their efforts to resuscitate the stone-quarrying and stone-building industries in Scotland. On the question of price, the Board had found areas where native stone building was cheaper. At Kirkwall, for instance, they had saved £600 in construction costs plus £2,000 on steel for the structure.



The scene at Glen Tarsan dam—Cowall Scheme

The Newcastle-Thirsk 275 kV Line



AN interesting innovation in the towers for the 275 kV line from Newcastle to Thirsk, the contract for which has recently been placed with the British Insulated Callender's Construction Co., Ltd., is the use of high-tensile steel for a proportion of the tower sections and bolts.

The new line, 62 miles in length, will form part of the double-circuit line from Clyde's Mill to West Melton, each phase of each circuit being equivalent to twin 0·175 sq in. copper. Actually, twin S.C.A. conductors (37/0·110) are being used with 12 in. spacing between conductors of each phase, in horizontal formation. The earth conductor will be single S.C.A. 0·175 sq in.

Suspension insulator strings normally consist of 18 11-in. glass insulator discs with an overall length of 11 ft 2½ in. and the normal span length will be 1,000 ft with a maximum sag of 27·25 ft at 122 deg. F.

The accompanying illustration shows an impression of the towers, with a height of 115 ft 3 in., designed by Blaw Knox, Ltd. A prototype tower was recently tested at the works of Painter Bros., Hereford.

On left is an artist's impression of one of the towers

Notes on Wiring
by MEGOHM

Invitations to Tender

Scope for standardisation in documents and drawings

INVITATIONS to tender for electrical installation works are today mainly sent out by the various Ministry Departments, British Electricity Authority, consulting engineers and the engineering departments of large industrial organisations.

An examination of the tender documents, specifications and drawings issued reveals there is little uniformity between the various departments issuing invitations to contractors other than that it is usually specified that the work is to comply with the I.E.E. Regulations for the Electrical Equipment of Buildings plus any special requirements.

Comparing specifications and drawings issued by the Air Ministry and the Ministry of Works, for example, shows that each department has its own set specification and drawing symbols, and in the latter case neither comply with the British Standard Institution drawing symbols which, of course, are given in the I.E.E. Regulations for the Electrical Equipment of Buildings. Again, comparison of specification and drawings issued by the B.E.A. Divisions show them to differ, no doubt to meet individual requirements.

This comparison, of course, may be extended to take in the Admiralty, War Department, B.B.C., L.C.C., and last but not least, consulting engineers from which it will be observed that they all differ. It may be argued that variety is the spice of life and a free hand allows for initiative and development. No one will object to this admirable point of view, but the multitude of symbols and variations of descriptive instructions issued with inquiries for electrical installation work is, I am told, of concern to contractors, estimators and engineers.

The plea for a standard code which would be of considerable assistance and save much time and cross reference in preparation and examination of tenders should be given consideration. A simplified Form of Tender, contract conditions, specification and drawings prepared for electrical installation work excluding all general clauses not strictly applicable to electrical installation work such as clauses calling for operating instructions which is sometimes included in specifications and which quite obviously are related to plant installation and the like, would be desirable.

Instructions Required

Contract and estimating engineers require simple and straightforward instructions to enable them to prepare accurate estimates. Concise tender documents are needed and should comprise: (a) Tender form embodying reasonable sub-division for definite works, and the prime costs and/or provisional sum items. (b) Standard condition of contract applicable to the electrical contracting industry. (c) Specification for (1) work to be carried out; (2) materials to be used. (d) Drawings showing clearly and accurately: (1) position of control and distribution equipment and outlet points; (2) main distribution diagram and diagrams for special circuiting arrangements with rating given for control and distribution equipment and cabling.

Specifications for electrical contract work should not include the works usually carried out by civil engineering and building contractors, since this work can generally be carried out more economically by the main contractor.

Conditions of Contract should not include clauses, the interpretation of which is dependent on the attitude adopted by the engineer, such as:—

The Contractor shall submit to the Engineer at such intervals and in such form as may be required by him, progress reports, etc. The Contractor shall submit instructions with drawings and documents and shall supply such further copies as may be required, etc.

All apparatus and materials shall be designed to ensure satisfactory operation, cables and accessories shall satisfactorily withstand variation of loads, etc. All materials used shall be of best quality, etc.

All apparatus and materials shall comply with I.E.E. Regulations and appropriate British Standard Specification.

With all these repeating clauses, one is left to wonder, has the engineer designed the job or is the contractor left to check the engineer's work and his selection of apparatus and materials.

Smoke Abatement!

Proceedings at the 18th Annual Conference

THE eighteenth annual conference of the National Smoke Abatement Society was held last week at Blackpool. The Presidential Address, by Dame Vera Loughton Mathews emphasised the unbalance between sections of the community as far as coke supplies were concerned. The domestic market, she said, had the last call on available stocks. Looking to the future, it should have had the first, in order that the recommendations of the Simon Report in regard to space heating by smokeless solid fuel could be implemented. She suggested that coal should be supplied to the carbonising industries at a cheaper rate, the financial loss thereby incurred being made up by charging more to the domestic consumer, who burnt coal in its raw state.

First of the more technical papers was by Dr. J. Bronowski, Director of the Central Research Establishment of the National Coal Board, who dealt with wasted energy due to incomplete combustion. The British could not take their place among the leaders of world industry if they continued to waste 17 hundredweights of the energy in every ton of fuel by allowing it to go up the chimney. Atomic energy might be a possibility in 25 years, but in the meantime we must learn to utilise the waste energy which was potentially available. Shortages of raw materials could be overcome by the development of substitutes, but these usually involved the expenditure of energy. We just could not afford to waste this. One of our troubles was obsolete plant, and another was the lack of technologists to translate developments from laboratory to factory.

Industrial Steam Plant

One of the greatest causers of smoke is the small steam raising and central heating installation. Five short papers were read on this type of system by technical experts. Mr. V. R. Chadwick described how coal should be hand-fired to ensure that the volatile matter burnt off does not give rise to smoke. Mr. C. H. G. Hayward outlined the development of chain grate stokers; Mr. H. E. Pearsall dealt with coking and sprinkling stokers; the underfed stoker was explained by Mr. C. C. Day, and, in the last paper of the series, Mr. G. A. G. Ive dealt with photo-electric cell devices for detecting smoke.

As far as larger boiler plant was concerned, Mr. N. Higginson described the work done to prevent smoke nuisance from collieries. The long-term policy was electrification, but in the interim, the National Coal Board was making efforts to modernise existing plant.

Gas works were dealt with by Mr. J. W. Denton of the Gas Council, who described the precautions being taken in modern gas producing installations.

For the British Electricity Authority, Dr. H. E. Crossley surveyed the three forms of pollution for which power stations might be responsible. The first—that of water droplets from cooling towers—has recently been solved by the introduction of trapping louvres. Sulphur extraction was more difficult and involved both technical and economic difficulties. The B.E.A. believed that effective dispersal of the gases could be attained by high chimneys.

Grit emission had often given rise to local nuisances in older power stations which had not been equipped with efficient grit arresters, but design was being constantly improved.

Mr. Neil H. Turner for the British Iron and Steel Federation agreed that iron and steel works had, in the past, been great culprits in regard to smoke and dust emission. The sources within the works of pollution, were, however, so numerous, that the problem was one of extreme complexity.

Finally, Mr. E. Burke, of the Cement Makers' Federation, pointed out that their trouble was not due to incomplete combustion or smoke emission, but was due to the raw material passing into atmosphere with the flue gases. Electrostatic precipitators and chain baffles had however proved effective.

The Domestic Scene

At the closing session, the domestic use of fuel was discussed. First, Mrs. Elspet Fraser-Stephen of the Woman's Advisory Council on Solid Fuel made a plea for the abolition of the old-fashioned fireplace and grate and the substitution of a modern type of fire or an openable stove. Miss Lovell Burgess, of the Gas Council, stressed the importance of using coke and gas, while Dame Caroline Haslett emphasised the great contribution to the cleanliness of our homes and towns made by electricity. In use, electricity made no smoke or dirt, and although power stations burned over 16% of the nation's coal they produced less than ½% of the smoke emitted.

Troubles—and Remedies

A series* of trouble-shooting tables specially compiled to assist maintenance engineers in rapid fault diagnosis

No. 8. ROTARY CONVERTORS

By S. SPENCE, B.Sc.

THE rotary convertor combines three types of electrical equipment, namely the synchronous induction motor, the direct current generator (these two being combined in one machine), and the transformer supplying alternating current to the slip rings. Defects likely to occur in any of these types will affect the performance of the rotary convertor, whilst simultaneous faulty conditions in more than one of the three components might render diagnosis more difficult. There are also certain troubles peculiar to the rotary convertor, familiarity with which can only be gained by actual operating experience as different machines may not respond in exactly the same way to the same type of fault due to differences in the machine characteristics. Careful reasoning and systematic elimination of possible sources of troubles may therefore be necessary before arriving at the primary cause of observed symptoms.

*Previous tables have appeared as follows: Induction Motors, June 15, 1950; Transformers, July 27, 1950; D.C. Motors, Nov. 9, 1950; Synchronous Motors, Jan. 4, 1951; Single-phase FHP Motors, March 1, 1951; A.C. Generators, May 17, 1951; Mercury Arc Rectifiers, July 26, 1951.

SYMPTOM	CAUSE	REMEDY
General overheating.	Sustained overloading.	Reduce the electrical load or switch in an additional convertor (if this is not provided for automatically).
	High ambient temperature.	Reduce by improving ventilation of convertor house, which may necessitate structural alteration or installing forced ventilating system.
	Adjacent source of heat.	Alter lay-out of equipment as necessary or protect the convertor by means of a suitable barrier in the path of the transmitted heat.
	Restricted ventilation due to internal obstructing dust deposits.	Dismantle the convertor for thorough cleaning. Adopt any practicable measures such as the installation of air filters to prevent ingress of dust.
	ncorrect supply voltage or wrong voltage tapping on transformer. (See Note 1.)	Excessive variation of excitation should be avoided, and it is desirable to operate rotary convertors as near unity power factor as possible. (See Note 1.)
Overheating of one or more individual coils in the armature.	Short-circuited or open-circuited coil or coils.	Repair or rewind the defective coil or coils.
	Incorrect connections between coils and commutator segments, usually due to adjacent connections being crossed during repair or rewind.	Reconnect coils to correct segments.
Overheating of all the shunt field coils.	Excessive current consumption due to: (*a*) Short-circuited turns. (*b*) Excessive voltage. (*c*) Not enough turns in the field winding, which might result from an unsatisfactory repair.	(*a*) Locate and repair the defective coil or coils. (*b*) Reduce the voltage across the field. (*c*) Increase the number of turns or insert a suitable external resistance.
Overheating of one or more shunt field coils, the remaining coils being cooler than normal	Excessive current in the hot coil or coils due to the remaining coils being completely short-circuited.	Locate and repair the short circuit.

SYMPTOM	CAUSE	REMEDY
Overheating of series field coils	Excessive current due to: (*a*) Short-circuited turns. (*b*) High current density. (*c*) Sustained overloading.	(*a*) Locate and repair defective coil or coils. (*b*) Rewind coil or coils with increased gauge of wire, or increase the number of turns. (*c*) See General Overheating.
	Inadequate sharing of load current in parallel operation due to equaliser connection having excessively high resistance.	The checking of the correct resistance value for the equaliser leads is a matter for the designer. (In practice the cross section of the equaliser connections should not be less than 50% of that of the main cables.)
Overheating of commutator or slip rings	Excessive brush friction and/or contact drop due to: (*a*) Tarnishing and oxidation of commutator or slip rings. (*b*) Rough commutator or slip rings. (*c*) Excessive brush pressure. (*d*) Wrong grade of brush.	(*a*) Ingress of gases is a common source of this trouble, and all practicable precautions should be taken to prevent injurious gases from coming into contact with the commutator and slip rings. (*b*) Turn or grind and polish to restore the commutator or slip-ring surface. (*c*) Reduce pressure by suitable adjustment of spring tension. (*d*) Consult the makers if necessary to confirm the correct grade.
	Excessive current density.	Check the current consumption and, if normal, consult the makers with regard to the recommended density for the correct type of brush.
	Inadequate means for heat dissipation.	This is fundamentally a problem for the designer of the machine. A reduction of the operating temperature, however, might be achieved, by adopting any practicable measures for improving the ventilation of the commutator and slip rings.
Sparking at commutator and/or slip rings.	Excessive overload.	Reduce the electrical load or switch in an additional machine (if this is not provided for automatically).
	Brush vibration due to: (*a*) Eccentric commutator or slip rings. (*b*) Low bars or flats. (*c*) Rough or grooved commutator or slip rings. (*d*) Distorted slip rings.	(*a*), (*b*), (*c*), (*d*) True the commutator or slip rings by turning or grinding and polishing. It is preferable to do this with the armature in its own bearings, and the windings must, of course, be carefully protected to prevent the ingress of dust or turnings. If the edges of the commutator bars have dragged over the mica sections, the latter should be carefully scraped and, where the mica is recessed, the edges of the bars should be slightly bevelled.
	(*e*) Distorted commutator. (*f*) High commutator bars.	(*e*), (*f*) Re-season the commutator by heating it uniformly to a temperature of about 100 deg. C., followed by running it at full speed and then tightening up the commutator bolts as necessary whilst the commutator is still hot, and finally re-grinding. The treatment should be repeated as necessary until the commutator has finally settled down.
	(*g*) Excessive clearance in brush holders.	(*g*) Change brushes or holders after ascertaining which are incorrectly dimensioned, to obtain correct fit.
	(*h*) High micas in commutator.	(*h*) Reduce the mica sections slightly below the level of the commutator bars.
	(*i*) Unbalanced commutator.	(*i*) Dynamically balance the armature at its normal speed.
	(*j*) Slip ring loose on its bush.	(*j*) Re-secure ring on the bush, which usually involves re-shrinking.
	(*k*) Loose brush holders.	(*k*) Re-secure brush holders.
	Machine vibration due to: (*a*) Unbalanced armature. (*b*) Excessive axial oscillation, resulting in the armature fouling the bearing pedestal on which the brushgear is frequently mounted.	(*a*) Re-balance armature dynamically at its normal speed. (*b*) Reduce axial movement by adjustment of the oscillator.
	Inadequate clearance in brush-holders.	Adjust the brushes to ensure that they slide easily in their holders.

SYMPTOM	CAUSE	REMEDY
Sparking at commutator and/or slip rings (contd.)	Imperfect bedding.	Re-bed the brushes correctly to commutator or slip-ring surface, to ensure that the full area of the brush face makes contact.
	Incorrect position of brushes on commutator.	Adjust brush position as may be necessary.
	Incorrect mounting of slip-ring brushes resulting in axial overhang on the ring.	Reset brushes correctly on the ring.
	Incorrect spacing of brushes round commutator.	Check by actual linear measurement between brushes on adjacent arms. Inaccurate spacing may be due to shrinkage and displacement of insulation from brush arms, faulty construction or incorrectly assembled boxes. Any such defects located should be suitably remedied to equalise the spacing.
	Incorrect brush pressure.	The pressure must be uniform to prevent unequal distribution of current between the brushes, whilst too little pressure has the same adverse effect due to the resulting brush vibration. (See Note 2.)
	Unsuitable grade of brush.	The same grade of brush as was originally supplied should always be used unless an alternative recommendation is approved by the makers.
	Excessive current density in brushes.	See overheating of commutator or slip rings.
	Pitting of the slip rings due to: (*a*) The action of atmospheric impurities on the rings during standing periods. (*b*) The brushes being so arranged that maximum value of alternating current passes at the same point in the ring and in the same direction from the brush to the ring at every revolution.	(*a*) During lengthy periods of stoppage, direct contact between ring and brush should be prevented by means of paper inserted when the machine is shut down. (*b*) Rearrange the brushes to obtain more even distribution of load current in the ring.
	Unequal air gaps.	Equalise the air gaps by adjustment or renewal of bearings, correction of radial position of pole shoes, etc.
	Open circuit, short circuit or defective joint in armature.	Locate and repair defect.
	Short circuits between adjacent commutator segments.	Carry out a potential drop test to locate shorts. Repair or renew defective mica sections, remaking any defective commutator joints.
	Brush arms and interconnectors having unequal resistances, with resultant unequal current distribution in the arms.	Remove and overhaul all leads and brush terminal contact faces with a view to eliminating any points of high resistance due to tarnished or otherwise defective contact.
	Defective main field or commutating pole winding.	Locate and repair any defect such as a short circuit or earth fault, which by spoiling the magnetic symmetry, has the same effect as unequal air gaps.
	Commutating poles reversed.	Check the polarity of the poles with a compass needle. Reverse any incorrectly connected coils. Reverse the connections to any individual coils of wrong polarity.
	Load instability of compound rotary convertors operating in parallel, which in extreme cases may cause a flashover at the commutator.	See "unequal load distribution in parallel operated rotary convertors."
Hot bearing (ring oiled).	Insufficient oil in well.	Top up oil level.
	Leakage of oil from well past drain plug or gauge glass.	Refit drain plug or gauge glass correctly.
	Oil well overflow pipe bent or displaced, thereby reducing oil level in well.	Refit pipe in correct position.
	Obstruction in overflow pipe.	Flush out and refill with oil.

SYMPTOM	CAUSE	REMEDY
Hot bearing (ring oiled) (contd.)	Oil ring stationary or sluggish in action, due to: (*a*) Ring tight in slot.	(*a*) Reduce width of ring and polish sides smooth.
	(*b*) Ring damaged.	(*b*) Repair or renew ring.
	(*c*) Foreign matter in oil.	(*c*) Clean oil.
	(*d*) Wrong grade of oil.	(*d*) Replace by suitable grade.
	(*e*) Bearing turned in housing due to set screw becoming loose or defective, thereby displacing oil ring slot from normal position.	(*e*) Re-secure bearing in correct position.
	(*f*) Oil ring jumped out of slot.	(*f*) Fit retaining strip across top of slot.
	Bearing metal dust or other obstructions in bearing oil grooves.	Remove bearing for cleaning of grooves.
	Bearing oil grooves incorrectly cut.	Remove bearing and modify grooves, making sure they are correctly located, cut and backed off. The inside of the ring slots should also be backed off.
	Tight bearing.	Scrape bearing to correct fit.
	End thrust on bearing due to: (*a*) Incorrect assembly. There might be insufficient end clearance in the case of a machine provided with an oscillator.	(*a*) Reassemble machine with armature in magnetic centre. If the machine is provided with an oscillator, the journal should be centralised without the oscillator.
	(*b*) Defective oscillator.	(*b*) Repair or overhaul oscillator to obtain correct axial movement of armature.
	Shaft out of true.	True shaft in lathe and renew bearings.
Hot bearing (ball and roller).	Diametric clearance too small.	Fit new bearing having larger clearance.
	Incorrect fit: (*a*) Inner race too tight on shaft.	(*a*) Polish shaft and refit bearing, making race a tight press fit to prevent "creep."
	(*b*) Outer race tight in housing.	(*b*) Polish housing as necessary to make bearing race a sliding fit on its seating.
	Too much grease.	Remove excess grease.
	Wrong grade of grease.	Replace by suitable grade recommended by the makers after due consideration of normal operating temperature conditions.
Noisy or rough bearing (ball and roller).	Excessive wear. Defective (flatted or chipped) ball or roller. Fractured cage or race.	Fit new bearing.
	Movement of bearing race: (*a*) Inner race loose on shaft.	(*a*) Build up shaft (by metal spraying process) and machine to correct diameter. Fit new bearing.
	(*b*) Outer race loose in housing.	(*b*) Bore out and bush housing to correct diameter; or build up and machine; or fit new end bracket or pedestal. Fit new bearing.
Overheating and pitting of bearings.	Circulating currents in shaft, bearing and bedplate, due to unbalanced a.c. currents or the d.c. end connections used for the series field and commutation pole windings.	The usual remedy is to insulate one of the bearing pedestals from the bedplate. The d.c. end connections should be arranged so that the resultant ampere-turns round the shaft is zero.
Rotary fails to start or unable to run up to speed.	Starting voltage too low: (*a*) Supply voltage low.	(*a*) If the supply voltage cannot be increased, a higher voltage tapping should be employed, to obtain the necessary starting voltage, which for tap started rotaries is about 30% of the normal a.c. voltage.
	(*b*) Faulty transformer (open circuit, wrong connection, etc.).	(*b*) Trace and repair defect.
	(*c*) Excessive voltage drop in leads.	(*c*) This is only likely to occur with heavy current machines, in which cases the leads should be constructed to give the least possible drop.
	(*d*) Wrong choice of tapping.	(*d*) Connect more suitable tapping.
	Excessive voltage induced in field winding due to starting with field circuit open. This may result in flashover of field coils or puncturing of insulation.	Field winding switch should always be closed during starting.

SYMPTOM	CAUSE	REMEDY
Rotary fails to start or unable to run up to speed (contd.)	Open circuit or short circuit in armature winding or damper winding; broken slip-ring lead; brushes sticking out of contact with rings, etc.	Trace and repair defect.
	Short-circuited field coils.	Locate and repair faulty coils.
Rotary fails to synchronise	Starting voltage too low.	See previous symptom. Rotaries synchronise best at a starting voltage of 15% to 25% of the rated voltage on the a.c. side.
	Field winding wrongly connected.	Reconnect winding correctly.
	Open circuit in excitation circuit.	Trace and repair fault, which might be a broken wire or lead or defective terminal connection or joint.
	Excessive resistance of damper winding due to defective contacts or broken bars, with resultant excessive slip.	Repair or renew defective portion of winding.
Current surges when the full supply voltage is switched on the excited rotary.	In the case of motor-started, self-synchronising rotaries, this may be due to the starting motor torque near synchronism being too strong in relation to the synchronising torque of the rotary. The setting of the shunt field rheostat will also affect the synchronising torque.	It may be necessary to increase the excitation or even resort to field forcing during the starting period. The synchronising torque of the rotary might also be improved by cutting out of circuit a portion of the starting reactance or of the stator coils of the starting motor. In the case of tap-started rotaries, the switching-in surge can be very much reduced by using a buffer choke coil, which should be left in circuit for a few seconds between the starting and running operations.
Rotary synchronises with wrong polarity.	D.C. polarity reversed. In the case of a self-excited rotary started from the a.c. side, the polarity existing on the d.c. side depends entirely on chance.	Reverse polarity by pole slipping. (See Note 3.)
Rotary starts up in wrong direction.	Phase sequence of the slip ring induced voltages opposite to that of the supply.	In the case of independent synchronising it is desirable to ensure correct phase sequence by the usual synchronising lamp method (the test lamps being connected across the main starting switch contacts). (See Note 4.)
Hunting and falling out of step.	Rapid variations of load.	Such variations should be avoided if at all practicable (e.g., external short circuits on the d.c. side should be cleared immediately).
	Supply frequency or voltage disturbances due to short circuits in the supply.	Usually unavoidable.
	Short circuits in the windings.	Locate and repair defect.
	Machine under-excited (in this case, sparking at the commutator usually occurs).	Increase the excitation to restore stability
	Defective damper winding, such as broken bars or defective joints, resulting in increased resistance, which reduces the synchronising torque.	Repair defective portion of winding.
Racing	Disconnecting a parallel operated rotary from the a.c. supply without simultaneously disconnecting the d.c. side may cause the machine to accelerate to a dangerously high speed, particularly if under-excited. A rotary working from d.c. to a.c. which is not paralleled on the a.c. side may overspeed on no-load operation due to the field weakening effect of wattless current. The same danger may arise with this type of connection, due to short circuits in the a.c. supply.	For protection against these contingencies a centrifugal switch is usually provided which trips the d.c. switch when the machine attains a speed of about 15% above its rated speed.
Circulating currents in parallel operated rotaries	This occurs where two or more rotaries are supplied from the same transformer. It may also occur when star points of different rotary convertor transformers are connected together.	Every rotary should have its own separate transformer. Star points of different transformers should not be connected together.

SYMPTOM	CAUSE	REMEDY
Excessive d.c. voltage variation.	Variation of a.c. supply voltage.	Can only be remedied by the supply authority.
	Incorrect brush position (brushes too much displaced).	Adjust the brush position as necessary.
	Wrong connection of compound and commutating pole windings.	Reconnect the windings correctly.
	Wrong excitation.	Locate and rectify defect in excitation circuit.
Unsatisfactory d.c. voltage regulation.	*Transformer Tapping Control.* Faulty operation of tap-changing gear.	Overhaul or repair gear as may be found necessary.
	Induction Regulator Control. Defect in regulator such as open circuit in potential winding.	Trace and repair faulty portion of winding, etc.
	Reactance Control. Defect in field regulator such as poor contact, or defective connection or resistance element.	Locate and repair defect.
	All Types. Fault in field winding, such as short circuits between turns, defective connection, etc.	Trace and repair defective portion of winding, etc.
Unequal load distribution in parallel operated rotaries.	Differing characteristics of the rotaries such as dissimilarity of voltage variations, in which case an excessive voltage drop results in the load on the d.c. side being reduced.	The rotary can, to a small extent, be adjusted by brush displacement (forward displacement from the neutral zone increasing the voltage drop). (See Note 5.)
	Equaliser connection resistance too high with respect to the main cables and series field winding.	

NOTES CONCERNING THE TABLE

NOTE 1.—A low a.c. voltage (and as a result the d.c. voltage and loading) are raised by over-exciting the convertor, which, if carried too far, causes overheating.

Similarly if the a.c. voltage is too high, it would be necessary to operate the machine under-excited to obtain the correct d.c. voltage, with a resultant increased wattless current and heating.

The most suitable transformer voltage tapping should be used, and where adjustment of d.c. voltage is required from time to time, either for load sharing of parallel operated machines or for voltage control, this must be effected by altering the slip-ring voltage by such methods as (*a*) transformer tapping adjustment; (*b*) induction voltage regulator, or (*c*) in cases where the voltage variations are not required to exceed about $\pm 6\%$, reactance control may be employed.

NOTE 2.—Brush pressures of $1\frac{1}{2}$ to 2 lb per sq in for the commutator and 2 to 3 lb per sq in for the slip rings are usual for rotary convertors.

NOTE 3.—In the case of a tap-started rotary, the field should be reversed by means of the switch provided, whilst the machine is running on the starting voltage. The shunt field is thereby reduced to zero, after which the field switch should be returned to its normal position when the polarity will build up correctly.

In the case of a motor-started rotary, it should be run up in series with the starting motor with the field switch open, and as synchronism is reached and is shown by the fluctuation of the d.c. voltmeter needle about the zero point, the field switch should be closed as the voltage swings to the correct polarity, when the machine will usually build up satisfactorily.

NOTE 4.—In the event of a self-synchronising 6-phase rotary starting up in the wrong direction due to the phase sequence of the supply to the slip rings being non-standard, this can be corrected by interchanging two of the h.t. connections to the transformer. If this is not practicable, the change can be effected by interchanging four leads at the slip rings.

NOTE 5.—To ensure satisfactory operation in parallel and the sharing of the total load correctly over the whole range, without frequent adjustment of the shunt field excitation the following conditions should obtain:—

(*a*) The transformers should have the same percentage reactance.

(*b*) The ratio of the transformers and the no-load slip-ring voltages should be the same.

(*c*) The voltage characteristics of the rotaries should be the same.

(*d*) Compound rotaries should have equaliser connections as for compound d.c. generators (the equaliser resistance being such as to ensure sharing of the load current in the series field windings in proportion to the ratings of the machines).

G.P.O. Research

Open Day at Dollis Hill

THE Post Office Research Station at Dollis Hill is primarily established for the purpose of maintaining and improving the efficiency of the telecommunication services provided for the public. As a secondary task it is also consulted on telecommunication and allied problems by Government Departments and carries out work on their behalf. Care is taken to co-ordinate the work being done with that carried out in the Universities, other Government Research Establishments, and Industry, to avoid the duplication of effort and consequent waste of scientific manpower.

Once every three years the Station holds an Open Day during which invited guests are permitted to examine the work in hand and to question the scientists engaged in such work. The Open Day fell this year on September 28, although a preview was held on September 27 to which a restricted number of guests and members of the Press were invited.

Scope of the Work

It might be thought that with the terms of reference, as quoted above, the work being carried out would be necessarily of a restricted nature. In fact, however, the detailed ramifications of modern telecommunications are such that the laboratories are engaged in a most extensive variety of tasks, ranging from the determination of minute quantities of arsenic to the building of serial type electronic computors. Particular attention is being paid to the properties of magnetic materials such as the nickel-iron alloys and the ferrites, and, as would be expected, to the improvement of transmission over lines. This latter work has received a considerable impetus with the spread of television. The "growing" and treatment of artificial piezo-electric crystals of the water soluble type is also of interest.

It is, of course, impossible to cover in detail the immense amount of work that is being done in this large establishment, but we give below a few of the interesting items seen.

Television Research

Although the responsibility for the taking and transmission of television programmes lies in the hands of the B.B.C., the cable links between various points are the responsibility of the G.P.O. and much work is being done to ensure that the picture shall not suffer from distortion due to attenuation or spurious echoes arising in these links. Characteristic of this work is the development of an automatic regulator for a coaxial-cable transmission link, whereby a pilot signal transmitted over the link operates the regulator which compresses level variations of ± 3 db to 0·1 db. Test equipment made for the purpose of checking links includes a "sine-squared" pulse generator producing pulses of 0·17 μs half amplitude width, with a repetition frequency of 10 kc/s. Means are, however, provided for triggering the generator from an external source. A precision square-wave generator converts an external sine-wave in the range 20 c/s to 1 Mc/s to a square wave having a rise-time of less than 0·05 microseconds and the "horizontals" flat to within 1%. These instruments were made by Cintel.

It is well known that a pulse travelling along a cable suffers attenuation. In the case of television pulses, where long cables are involved the pulse also picks up a train of following waves. These give rise on television sets to "fringe" effects, particularly where the contrast is a maximum, and many viewers are aware of the "halo" surrounding bright objects seen on the screen particularly in outside broadcasts. A variable wave-form corrector of the "multi-echo" type has been developed whereby a wide variety of transmission characteristics can be provided by combining the input signal with a series of both advanced or retarded "echoes," or attenuated replicas of itself. These artificially induced echoes are arranged to cancel the naturally formed wave trains so that the received signal is very nearly as clean as the one transmitted. Each echo is adjustable both in amplitude and sign so that a wide range of line characteristics can be compensated.

Magnetic Phenomena

The work devoted to magnetic materials is mainly of a fundamental nature. By applying a longitudinal magnetostatic field to a ferrite sample and transmitting polarised centimetric waves through it, it can be shown that the plane of polarisation is rotated, the amount of rotation being dependent on the strength of the field, and the characteristics of the ferrite.

In conjunction with other fundamental research on the subject, this work is expected to aid in an understanding of the behaviour of ferrites.

With Mumetal, which is much used in the form of tape for "loading" lines, it has been found that the permeability decreases under mechanical stress. G.P.O. experiments, however, show that there is also an increased loss, which is probably a "residual loss" of the kind observed in powder cores. Research is being carried out on the investigation of this loss and its quantitative assessment.

Another interesting magnetic phenomenon under investigation is the property of storing information in a small core of high remanence and low coercivity. This is mainly important in the design of digital computers working in the binary system, one of which is being built for the Ministry of Supply by the G.P.O.

This particular instrument is similar in operating principles to the Automatic Computing Engine being built for the N.P.L., although the component lay-out and general appearance is somewhat different. In this unit germanium crystals are being used for blocking purposes.

Miscellaneous Experiments

One development, which has applications outside the G.P.O. field, is a thermostatically controlled soldering iron. This consumes a maximum of 100 watts at 50 volts d.c. as at present designed, although there should be no difficulty in modifying it for use on standard mains. An unusual feature is that the copper bit is largely contained within an Invar steel tube, the latter having a coefficient of expansion of negligible proportions, and it is the differential expansion between the actual copper bit and the Invar which is used to control the microbreak switch. It will melt 60/40 solder in 80 sec. from cold and is at the proper soldering temperature within 100 secs.

The Chemical Department, confronted with the difficulty of detecting small quantities of arsenic in germanium used for crystal valves, has modified the Gutzeit test so that estimates of arsenic down to 10^{7}g. with a possible error of less than 10% can be carried out. In this test the arsenic is electrolytically reduced to arsine which stains a mercuric-chloride-impregnated paper in proportion to the amount of arsenic present.

Other experiments in progress include work on fading, investigations on valve cathodes, the growing and testing of crystals, the testing of telephone handsets, automatic sorting of letters and allied subjects.

Research for Industry

RESEARCH laboratories are well established as important departments of most large engineering firms in these days, while for the smaller establishment there is the Industrial Research Association to investigate fundamental matters of specialised interest in the technology concerned. Between these extremes there is room for an organisation offering research and development facilities to industry on a commercial basis. Last week we were privileged to inspect the laboratories of such a concern, Nash and Thompson, Ltd., of Tolworth, Surrey.

Organisation

This organisation is built round a staff of scientists and engineers collected together in wartime to tackle problems of gun-turret production and radar scanner design. Half-way house was responsibility for research and development of a large group of industrial companies; now facilities are offered to the whole of industry.

At the centre of this idea remains the collected knowledge of the team of engineers, chemists, metallurgists and physicists used to working together, and having at their disposal such anciliary services as an experimental shop and small-scale production department, a library and a drawing office. The type of problem they can tackle ranges from the unusual measurement needed by a firm not usually equipped for such a technique, to the complete investigation and production of a prototype for a concern venturing on scientific methods for the first time.

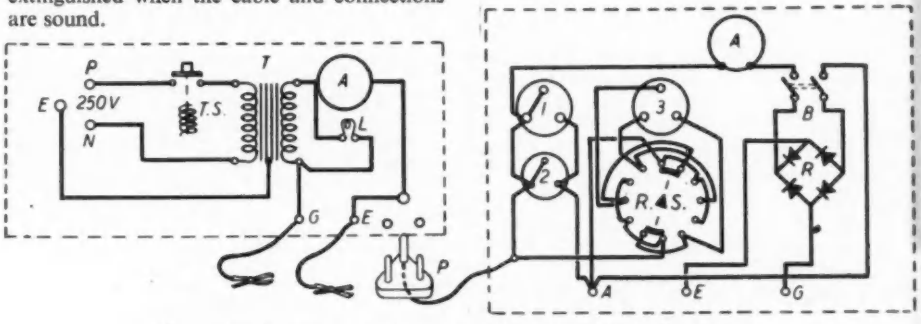
Items on Show

In an interesting afternoon examining the laboratories, some varied work was seen. Electronic development was characterised by a power circuit for heated spatula, used in restoring old paintings and required by the National Gallery to be temperature-maintained to $\pm 1^{\circ}$ C. At the other end of the scale of sensitivity, though not of measurement accuracy, were experiments on gas heating applied to washing machines, and life test procedure being carried out with temperature controllers.

Problems and Practice IN ENGINEERING

Tool Testing

THE periodical testing of portable electric tools and appliances is an important function of the maintenance shop, particularly with regard to the continuity of the earth conductor and its connections between plug earth pin and the metal case of the tool. The use of a "full load continuity testing set" for passing a heavy current through this circuit readily reveals weak points or bad connections. The current passed depends upon the size of conductor and the length of lead. For example, a 23/·0076 nominal area 0·001 has a resistance of 0·403 ohms for 50 ft, and from a short on the instrument case this should pass a current of 14 amperes. If the current was appreciably below this value, or fluctuated, a search of the cable by hand, whilst the current was flowing would, in the case of broken conductors, be revealed by an increase and steadying of the current if the point of the break was held in the hand. If the fluctuations or weak current persisted after the cable was searched by hand, an examination of the earth pin or metal case connection would no doubt reveal the faulty connection. An indicating lamp is also fitted which burns dull or is extinguished when the cable and connections are sound.



Corrections for test set and separate adaptor punch described in note

To enable similar tests to be made on the main circuit of flexible cables and tools. I have had constructed a separate adaptor panel and fitted in a metal rectifier which can be used when the current sent through the tool is less than 5 amperes. The rectifier d.c. current eliminates the tool reactance and passes a heavier current which is more clearly indicated on the smaller range ammeter of the adaptor set. The panel is fitted with various types of outlet sockets for single-phase and three-phase tools, and in the latter case a rotary switch is employed to test each phase in turn.

I include a sketch of the full load continuity test set and the adaptor panel, with notes on the method of carrying out tests for earth continuity and tool and cable circuit tests.

Earth Continuity Test.—Insert plug of adaptor set into socket of the continuity test set. Plug tool to be tested into suitable socket of adaptor set, and attach gripper "G" to metallic body of the tool. Press time switch of continuity set and the testing current will be indicated on ammeter. If this fluctuates or is low, the time switch remains closed for 10 seconds, which allows time for both hands to search the cable for the bad connection.

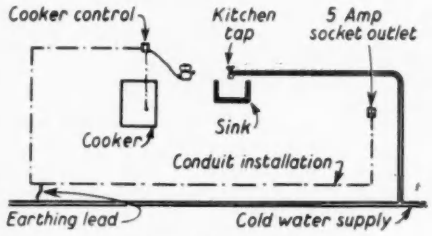
Tool and Cable Circuit Test.—For low-voltage tools leave the plug in the continuity test set and attach gripper "G" to terminal "A" on the adaptor set. With switch "B" off, press time switch, and for three phase tools, use rotary switch to obtain readings in each phase. If the current is below 5 amps. proceed as follows, which is the normal method for tools of mains voltage 200/250 V. Detach plug from the continuity test set and attach grippers "E" and "G" to their respective terminals on the adaptor set. Switch on "B" and press time switch. Currents up to 5 amps, depending on the resistance of the tool will be indicated on the adaptor set ammeter, and if fluctuating or weak, the cable

can be searched as before. If this fails to reveal bad cable connections, the tool socket, switch, brushes or winding connections should be examined until fault is located by steady ammeter readings.

The testing set is also useful for comparing currents passed through identical coils, or from phase to phase, and many other applications on a repair bench.—*T. H. Snelson.*

Single-pole Fusing

I WAS called to investigate the cause of a consumer receiving an electric shock which had been sufficiently severe in that the kitchen cold water tap and piping was torn away from the wall when the lady had been thrown back by the shock. Considering the diagram, the shock was alleged to have been received from the kettle whilst it was being filled with water from the tap. Naturally the



Layout of kitchen installation

first test for insulation resistance was applied to the kettle and cooker, but both were in order. Other portable equipment was also used in the house.

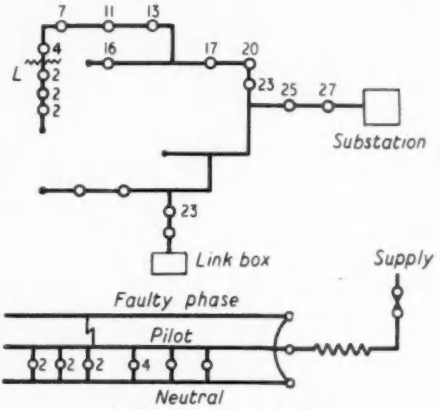
The complete installation was of screwed conduit and v.r.i. cables, and a visual observation would have led one to expect a first-class job. Earthing continuity was then tested and it was found that the cooker control panel was not properly connected with earth, although the conduits themselves were electrically continuous. It was now apparent that the conduit system must have been alive when the shock was sustained, and contact made between consumer, kettle and tap. Electrical tests were made on the cabling in the house, but the results were extremely good, showing all correct. The only procedure now available to adopt, bearing in mind that there was no doubt at all that the consumer had received a shock, electrical or otherwise, was to connect all portable apparatus to the socket outlets and await results. The trouble then came to light. A wireless set had been plugged into a faulty socket outlet which had caused the neutral and earth to touch and remain together, but only when the plug was inserted. The neutral fuse had ruptured at some time, and the supply to the wireless set was completed via the earth pin and conduit sheathing.

It seems that the earthing leads between the conduit and the earth electrode had become disturbed and the unusual fault on the socket outlet had made the conduit alive. Proper earth connection and replacement of the faulty socket outlet cleared the trouble, which would not have become so potentially dangerous in this case if there had been no neutral fuse to rupture, and at the same time leave the supply on.—*Ronald W. Marsh.*

Cable Fault Location

A READER expressed in your issue of July 12 (p. 67) the difficulties involved in applying a loop test on a faulty feeder. In the sketch, such a cable is shown; in this case the fault was a short between the pilot core and a phase core on a l.v. underground network. With the network dead, this was converted into a phase to earth fault by earthing the phase at the substation. The pilot core was made alive through a limiting reactor.

Using a bayonet adaptor connected through flex to a voltmeter, the direction of the fault was soon established by testing at each lamp standard. The approximate values of p.d.



Fault tracing on a feeder

obtained are shown. Where the value of p.d. remained constant at its minimum, it was apparent that the fault had been passed. The fault was then located in a service tee adjacent to the lamp "L" by injecting a signal into the main and using a search coil and amplifier for detection. All joints on the network are solid tees, and each length of main is of different section.—*E. Fairbrother.*

Lighting in Cobh Cathedral

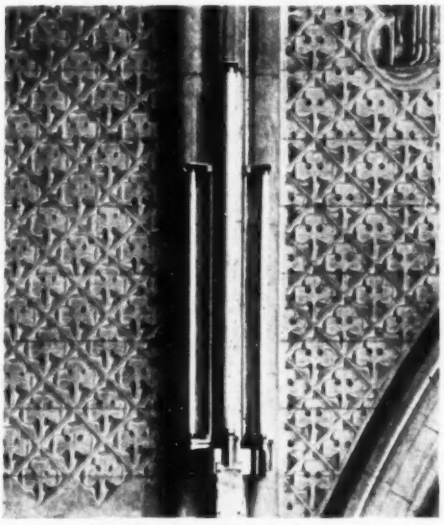
New Fluorescent Installation Eliminates Discomfort Glare

A NEW lighting installation in St. Colman's Cathedral, Cobh, Eire, is of particular interest not only from the architectural point of view, but from the fact that it provides more comfortable seeing conditions with lighting intensities actually lower than the old installation it replaced.

Originally lit by filament lamps suspended in the archways between nave and side aisles, with concealed floodlights for altar lighting the building appeared patchy, and there was considerable discomfort glare. The new installation, although giving only 2 lumens/sq. ft. at pew level and 6 l/sq. ft. in the sanctuary and on the altars, gives far more comfortable results, with its balanced brightness and absence of glare and enables architectural detail to be seen up to the highest point of the roof, whereas formerly nothing was visible above lamp level at night.

Most interesting feature of the new installation is the design of the vertical three-tube fluorescent units which are perfectly in keeping with the atmosphere of the building and inconspicuous by day. Eighteen units with one 4 ft. 40 W flanked by two 3 ft. 30 W tubes light the nave, while 14 units with one 2 ft. 20 W and two 18 in. 15 W tubes are installed in the side aisles, the mounting heights being 25 and 10 ft. respectively. Concealed single 5 ft. 80 W lamps on channel-type bases are used for sanctuary and altar lighting. "Natural" lamps are used.

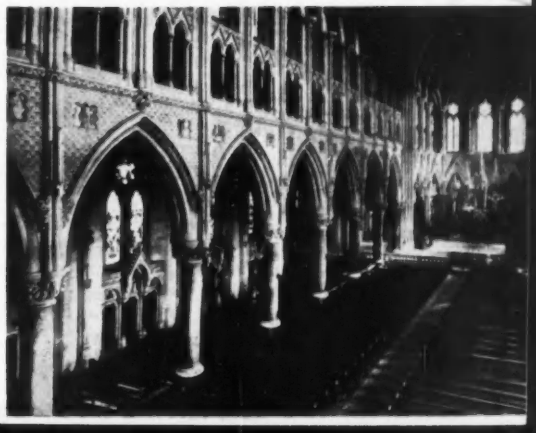
The Electricity Supply Board installed the equipment, in collaboration with the cathedral authorities, and the consulting architect, Mr. J. R. Boyd-Barrett, A.R.I.B.A., who designed the special lighting units, manufactured by John Smyth and Sons, Ltd., Dublin.



One of the 3-lamp lighting fittings used in the nave. The control gear is concealed elsewhere

General view of nave looking towards the High Altar, showing excellent delineation of detail

Below: This daylight view of the nave shows how inconspicuously the lighting fittings blend into their surroundings



overseas news

Tasmania's Plans

Development of two new hydro projects at Lake Echo and at Wayatinah on the River Nive in Tasmania, is proposed in a report by the State Electricity Commission to the Premier, Mr. Cosgrove. Estimated capital cost is £16,500,000. Authority to borrow the money needed is sought in a Bill to come before Parliament. The first station would be installed on the Dee River and would be fed by water from Lake Echo. It will have one 42,000 h.p. generating set. The Wayatinah station would be on the Nive and use these waters before they reached the important stations of Tungatinah, now under construction, and Tarraleah. Wayatinah power station will have a capacity of 140,000 h.p. made up for four or five units. The final step in the plan envisages a station lower down than Derwent, just above the junction with the Ouse River. It is hoped to have the first station operating by 1955, but the whole programme is not likely to be completed before 1957 or 1958.

Acquiring Power Stations

The New South Wales Electricity Commission expects to take control of the Sydney County Council power stations at Bunnerong and Pyrmont by the end of this year, the Minister for Works and Local Government announced last month. (The Sydney County Council decided on May 21 to ask Mr. Cahill to arrange for the Electricity Commission to take control of Pyrmont and Bunnerong power-houses as soon as possible.) The Commission formed in May last year has power to take over the generation and bulk supply, but not distribution, of electricity from the Sydney County Council and the generation of supply from the railway power-houses and the Southern Electricity Supply Undertaking.

First Loco

The first Diesel electric locomotive built in Australia ran successful trials between Granville and Penrith, N.S.W., recently. It is described as a main line loco with a speed of 90 m.p.h., and will be used by the Commonwealth Railways on the Transcontinental Railway between Kalgoorlie and Port Augusta. The locomotive is the first of an order for 11 placed with the Clyde Engineering Co. Pty. Ltd. The power equipment transmission and controls were supplied by General Motors Corporation of the United States.

Move on St. Lawrence

The announcement by President Truman last Friday that he would support a proposal for Canada to proceed alone with the construction of the St. Lawrence seaway and power project if it was not possible to have the joint development undertaken on the basis of the 1941 agreement between the two countries, has been welcomed in Ottawa, according to reports. The President prefers a joint action and still hopes that Congress will authorise construction on the lines of the 1941 agreement. The Canadian Parliament is to meet on October 9, but Mr. St. Laurent, the Prime Minister, has said construction is now certain. The Government is busy concluding negotiations with both Ontario and Quebec on the technical and financial aspects of joint power development in the respective provinces. Negotiations with Ontario are well advanced, it is stated. Cost of the power development to be borne by Ontario would be approximately $200 millions, and presumably a like amount would be paid by New York State, while the cost to Quebec Province for developing 1·2 million h.p. in the Lachine Canal section would also be about $200 millions.

A Referendum?

The fate of the Winnipeg undertaking is still undecided, and it appears that the electorate or the ratepayers in the city, will yet be called upon to vote on the question of taking over the metropolitan assets of the Winnipeg Electric Co. There are indications, however, that some members of the city council are in favour of implementing "plan C" of the Hogg report, which would make the distribution of power a provincial monopoly. Under the modified scheme, as recently outlined by D. M. Stephens, chairman and general manager of the provincial board, the latter body would take over all of the generating plants on the Winnipeg River and become the sole producer and wholesaler of power for the province. But distribution would be the function of a new municipal corporation to be set up for Greater Winnipeg, which would also take over the transit system and gas utilities of the Winnipeg Electric Co.

Another Set

The Hydro Electric Power Commission of Ontario has decided to install a seventh 100,000 h.p. unit at its power development at Niagara Falls, the Commission chairman, Mr. R. H. Saunders, announced last month. He indicated that the Commission was also anxious to utilise more fully the St. Lawrence River.

Manitoba Electrification

By the end of 1951 more than 50% of Manitoba's farms will have an electricity supply, Mr. W. D. Fallis, general manager of Manitoba Power Commission, stated earlier this month. By the end of 1955, rural electrification in the Province will have been completed, he added.

Work at Kaprun

The first and largest dam of the Kaprun hydro-electric power scheme, in the province of Salzburg, Austria, was officially inaugurated a few days ago by Dr. Korner, President of the Republic. The dam, 1,600 metres above sea level, is in use, and the power station itself is rapidly nearing completion (it is planned to be completed within two years). The station will eventually produce approximately 800 million kWh annually. Proposals for the Kaprun scheme were originally approved by the Austrian Parliament in 1938, before the German occupation. It has so far cost more than 500 million Austrian schillings (about £9 million). Roads and funiculars have been built, and more than 460,000 cubic metres of concrete was used for the dam just inaugurated.

Portuguese Contract

A £1,000,000 contract for the hydraulic, mechanical and electrical equipment for a new power station situated on the River Zezere, Portugal, has been negotiated by the English Electric Export and Trading Co. and the Metropolitan-Vickers Electrical Export Co. The station, about 120 miles north-east of Lisbon, is to be built by the Hydro-Electric Co. of Zezere. The power station will be equipped with two hydro-turbine units of 73,000 maximum h.p. each, with ancillary switchgear and transformer equipment, all of which will be manufactured in this country.

Norway's Expansion

Electricity production in Norway increased from about 10,000 million units annually just before the war to 17,300 million last year. According to an official of the Ministry of Industry, by this time next year production should be at double the pre-war rate. The Electricity Commission in 1947 decided that new generating machinery of 150,000 kW should be installed each year. So far this target has been maintained, taking the average amount installed in the years 1948-51, and the rate of installation of new generating plant is steadily rising. Additional capacity next year is estimated at 160,000 kW, with a further steady annual increase forecast.

Shortage in Bombay

To mitigate the serious power shortage in the Bombay-Poona region caused by sparse rainfall in the catchment area of the Tata hydro-electric system, the Electric Power Advisory Committee last week recommended an immediate cut of 25% in supplies to that region. This is to be put into effect. The Committee also suggested the adjustment of working hours and days in mills and factories, but a representative of industrialists has said that closure of the mills for a period was preferable to the introduction of staggered hours. The workers might not be averse to a two-month holiday, as the harvest season was approaching.

Design Link Up

An agreement was signed in New Delhi last weekend between the Government of India and the Government of the United States of America under which the U.S.A. will furnish to India scientific and engineering services connected with river valley projects through the U.S. Bureau of Reclamation. This is in pursuance of the general agreement of December last year providing for technical co-operation between the two Governments. Under this new link-up between the Central Water and Power Commission and the U.S. Bureau of Reclamation, designs, specifications and structural details which require a second opinion, or are too complicated for local solution, will be sent to the Bureau of Reclamation for review by its experts—where necessary, in co-operation with Indian engineers. In the meantime, the Commission's Central Designs Organisation is being steadily built up to deal with all possible problems in design and construction connected with river valley projects.

Big Lighting Plan

Singapore Municipal Commissioners have approved a $1,500,000 five-year plan for better street lighting in the Colony. This is the second five-year plan of its kind, the first costing $1,000,000, having been launched in 1947. The first scheme, covering about 80 miles of roadway with more than 3,000 street lamps, is expected to be completed by the end of this year. The second scheme, relating to 86 miles of roadway, may be put in hand early next year. Over 50% of about 3,000 electric lamps already installed are put out nightly under the present electric power economy scheme. The first stage of the new scheme, covering about 17 miles of roadway, will include the lighting of those streets which were lit by electricity pre-war but are not yet rehabilitated, and certain unlit "A" class traffic routes considered to be of high priority.

H.E. Works Progress

Although reasonably steady progress is being made with major public works now on hand in New Zealand, the rate falls below that scheduled at the outset of the majority of the schemes. The principal cause is an insufficiency of labour. This factor, allied with the burden of increasing costs, has caused considerable revision of original works estimates, and most projects are costing on present figures at least double the amount that would have been spent on them immediately before the war. These facts are given in a statement of its activities issued last month by the Ministry of Works. The busiest power development area is the Waikato Basin, where good progress has been made with much of the work. The powerhouse for the Maraetai station, which will have a capacity of 180,000 kW, is nearing completion and designs for the Whakamaru station, of 100,000 kW capacity, are well advanced.

PERSONALITIES

IN THE INDUSTRY

Many in the industry will be interested to hear that **Mr. C. T. S. Arnett,** O.B.E., B.SC., M.I.E.E., M.INST.F., controller of the North Western Division of the B.E.A., has retired. No successor has yet been nominated, we understand. Mr. Arnett served an apprenticeship with C. A. Parsons and Co. and afterwards joined the Cleveland and Durham Power Co. From 1913 to 1927 he was chief electrical engineer for Bolckow Vaughan and Co. and later chief engineer to Pearse and Partners. In 1931 he became operation engineer for the N.W. England and N. Wales areas of the C.E.B. and in 1939 was promoted to manager of those areas.

Mr. C. T. S. Arnett

Mr. E. S. Booth, M.ENG., A.M.I.E.E., A.M.I.MECH.E., engineer in charge of the Co-ordinating Section of the Generation Construction Department of the B.E.A., has been appointed generation construction engineer of the Authority. Earlier, he was generation engineer (construction) of the North Western Division of the B.E.A., after a period as deputy and then city electrical engineer and manager at Salford till vesting day. From 1938 till 1946 he was with the Yorkshire Electric Power Co.

Mr. E. S. Booth

The position at Belfast gets more complicated, for the General Purposes Committee last week rejected a recommendation from the Electricity Committee for the retention of **Mr. M'Candless** as deputy city electrical engineer and general manager at the increased salary of £1,800-£2,200. And in view of this, the chairman of the committee, **Alderman W. H. Cooper,** resigned from that office. The matter was discussed at the Council meeting on Monday, when, by 29 votes to 17 the City Council turned down a proposal that the General Purposes Committee should reconsider its decision. It was also stated that Mr. M'Candless had now left the Corporation's employ.

Mr. K. Preston, chairman and managing director of J. Stone and Co. (Holdings), has resigned from the Board of The Superheater Company, and **Mr. W. J. Ruston,** director of J. Stone and Co. (Holdings), and chairman of Ruston and Hornsby, has been appointed in his place. **Mr. L. C. Southcott** and **Mr. E. Lawton** have been appointed special directors of the Superheater Co.

Last week-end, **Mr. W. F. Boryer,** A.R.C.SC., M.I.E.E., retired from the position of chief regional officer of the London Postal Region of the G.P.O., which he has held since 1946. In all he has served with the G.P.O. for over 38 years, starting as an assistant engineer. In 1937 he was appointed assistant superintending engineer, and the following year became regional engineer, London Telecommunications Region. He held that post till 1944, when he was promoted to assistant controller (engineer) of the London Postal Region, prior to elevation to the major post.

The Metropolitan-Vickers Electrical Co., Ltd., has appointed **Mr. C. T. Scarf** as chief engineer, Industrial Control Department, in succession to **Mr. G. L. Newman,** who has transferred to the staff of the chief electrical engineer for special duties. Mr. Scarf has had a lifelong association with the design of electric control gear. Apprenticed with Simplex Electric Co., he gained experience with the Electric and Ordnance Accessories Co. In 1920 when the E. and O.A. interests were transferred to Metropolitan-Vickers, he entered the Industrial Control Department at Trafford Park, working first as a draughtsman and subsequently as an engineer. In 1928 he joined the English Electric Co. as chief engineer of the Industrial Control Department, and was responsible for developing a complete line of control gear. Six years later he returned to M-V, and in 1938 became assistant chief engineer of the Industrial Control Department. In 1942 he was appointed chief engineer of de Renzi, Holmes and Co., Ltd., and for the past three years he has been that company's general manager. Mr. Newman, who is now on special duties, under the chief electrical engineer, has been chief engineer of the Industrial Control Department since January 1949. Originally an

Mr. C. T. Scarf

Mr. G. L. Newman

M.V. apprentice, he did special government work in connection with searchlights, sound locators and radar aerials during the war. In 1945 he became engineer-in-charge of the newly formed Electronic Control Department, and at the end of 1946 received the additional appointment of assistant chief engineer, Industrial Control Department.

A further new appointment in the latter department of the company is that of **Mr. G. D. Harradine,** ASSOC. I.E.E., M.A.M.E.M.E., as assistant sales manager of the department. He joined the company as a draughtsman in 1927 and later transferred to the Industrial Control Sales Department. In 1933 he was made section leader, tenders, and became chief correspondent in 1947. He was appointed assistant to sales manager, Industrial Control Department, in 1949.

Mr. G. D. Harradine

Just arrived in this country is **Mr. F. C. Edmundson,** M.I.E.Aust., M.I.E.E., general manager and chief engineer of the State Electricity Commission of Western Australia. He expects to be here for several weeks, but his visit will also include business trips to the Continent.

Mr. J. T. A. Brooks, F.R.I.C.S., has been appointed chief quantity surveyor with the Ministry of Works, in succession to the late **Mr. C. A. Morrison,** C.B.E. Mr. Brooks has been with the Ministry for more than 30 years. For the last two years he has been assistant chief quantity surveyor.

Mr. Ernest Brook has resigned as chairman of Brook Motors, Ltd., although he remains a director. **Mr. F. V. Brook** has been elected chairman of the company, and **Mr. J. L. Brook** has been elected vice-chairman.

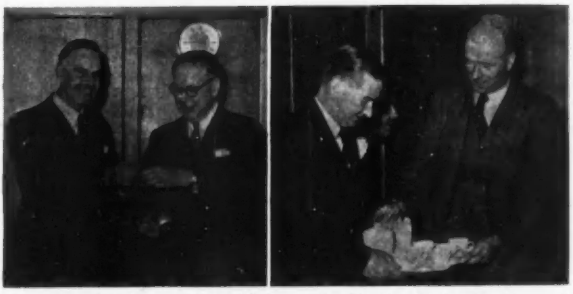
An informal ceremony took place at Group III headquarters of the London Division of the B.E.A., on Thursday last, when presentations were made on behalf of the station superintendents, to **Mr. J. N. Waite,** C.B.E., M.I.E.E., F.Inst.F., **Mr. H. J. Bennett,** A.M.I.E.E., and **Mr. L. M. Jockel,** M.I.Mech.E., M.I.E.E., F.Inst.F., F.R.S.A., all of whom are leaving the division. Mr. Waite is retiring from the position of divisional controller, Mr. Bennett is to become controller of the South Wales Division, while Mr. Jockel is retiring after 27 years as station superintendent at Hackney. To the latter, Mr. Waite presented an aneroid barometer, and gifts of cut glass wine glasses and a coffee set were handed to Mr. Waite and Mr. Bennett respectively by the generation engineer (operation) of the group, Mr. C. C. Hitchin, A.M.I.Mech.E., A.M.I.E.E., A.M.I.I.A., M.Inst.F.

When **Sir Charles Colston,** C.B.E., M.C., D.C.M., chairman and managing director of Hoover Ltd., returned to Britain recently from a six weeks' business visit to North America, he brought with him **Mr. H. W. Hoover, jun.,** assistant vice-president of the American company, elder son of the present chairman of the American company. Mr. Hoover, jun. will train as successor in due course to the present president of the American company, Mr. J. F. Hattersley, who has planned to retire by April, 1954. For, under the guidance of Sir Charles Colston, the volume of business of Hoover, Ltd. and its associated companies overseas has been so expanded as to now exceed that of the American company, and accordingly Mr. H. W. Hoover, jun., will study the successful methods of the British concern and its associates.

Mr. F. French has been appointed sales manager of the Sloan Electrical Co. Ltd., with effect from October 1. He originally joined the company in 1926 and subsequently occupied the position of assistant branch manager at Glasgow, then went to the Manchester branch in a similar capacity before coming to London. Here he was manager of the Wiring Accessories department, holding the latter position, except for five years' war service, until his appointment as assistant sales manager in February, 1950.

Mr. F. French

Off to South Africa in the *Pretoria Castle* on October 11 is **Mr. J. W. Butler,** of Seven Kings, who until now has been Branch Technical Manager, South-East Branch of Hoover, Ltd. He has been appointed Technical Service Manager, Hoover S.A. (Pty.) Ltd., at Johannesburg.



Mr. Jockel, left, gets his gift from Mr. Waite. Right, Mr. Bennett receives his coffee set from Mr. Hitchin (right)

The following staff changes, effective from October 1, 1951, are announced by British Thomson-Houston. **Mr. R. G. A. Dimmick,**

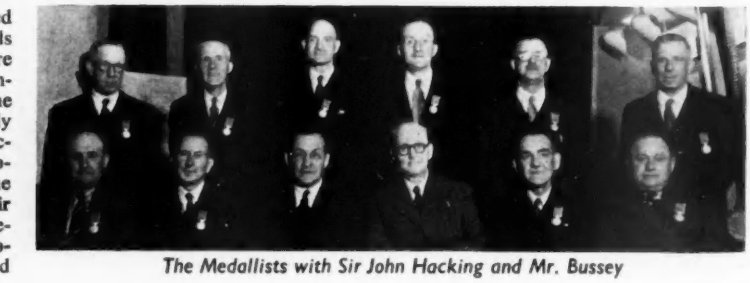
R. G. A. Dimmick

H. R. Canning

B.SC., M.I.E.E., A.M.I.Mech.E., A.M.I.N.A., becomes manager, Industrial Motor Sales Department, Rugby, *vice* Mr. C. A. Hall, M.C., who, as we note on page 619, is joining B.E.A.M.A. **Mr. H. R. Canning,** takes over as manager, Marine Department, Rugby, in succession to Mr. Dimmick. A former student apprentice, Mr. Dimmick three years later obtained a position in the Industrial Sales Department where he dealt with export contracts for specialised applications. During the Second World War he served in the Research Laboratory, and in June, 1945, transferred to the Marine Department for work on diesel-electric propulsion schemes, and on electric-torpedo production for the Admiralty. In the same year he took a leading part in the establishment of the Rugby sub-centre of the I.E.E. and became its first honorary secretary, and became chairman in 1948-9. In 1947, Mr. Dimmick was appointed manager, Marine Department, which position he has held until now. Mr. Canning received his technical education at Colchester and at the Battersea Polytechnic. He entered upon a student apprentice course at the B.T.H. works in 1924, and joined the staff of the Marine Department in March, 1928. In February, 1950, he was appointed assistant manager, Marine Department; and, now succeeds to the managership.

In our note last week on the newly constituted board of Verity's, Ltd., we inadvertently included the name of Mr. N. C. Hodson, a director, as one of the joint managing directors. The latter office is filled by **Mr. A. W. Hiley** and **Mr. R. S. Blackledge,** M.I.E.E.

We briefly noted last week the awards of British Empire Medals to ten employees in the electricity supply industry. Our accompanying photograph shows the recipients with **Sir John Hacking,** deputy chairman (operation) B.E.A., and **Mr. E. W. Bussey,** member for labour relations and welfare, B.E.A. Seen on the front row (left to right) are: Messrs. **J. T. Matthews** (Mitchell Construction Co.); **F. Wealthy** (South-Eastern Division); **Sir John Hacking**; **Mr. E. W. Bussey**; **Mr. J. H. Brown** (South-West Scotland Board); and **Mr. A. H. Chambers** (Midlands Board). In the back row (left to right) are: **Mr. F. Greenaway** (Southern Division); **Mr. D. H. Griffiths** (Merseyside and North Wales Board); **Mr. E. W. Boxall** (South-Eastern Division); **Mr. F. Mulryan** (North-Western Board); **Mr. J. G. Taylor** (North-Eastern Division); and **Mr. F. G. Timberlake** (South-Eastern Division).



The Medallists with Sir John Hacking and Mr. Bussey

Mr. A. Houghton Brown, A.C.G.I., B.SC., M.INST.C.E., has been appointed senior civil engineer in the Civil and Building Branch, Chief Engineer's Department of the B.E.A., under the deputy chief engineer (construction). Formerly with the London Power Co., he has latterly been civil engineer to the B.E.A.'s Generation Construction Department at headquarters.

The British Thomson-Houston Co., Ltd., has nominated **Mr. A. G. W. Cannon,** A.M.INST.P.E., as manager of their Birmingham works in succession to the late **Mr. E. M. W. Boughton,** M.C. After serving an apprenticeship at the B.T.H. Rugby Works, Mr. Cannon went to the Birmingham Works as jig and tool draughtsman in 1920. He was appointed plant and planning engineer in 1929; and became mechanical superintendent in 1941.

Mr. A. G. W. Cannon

Mr. P. G. Wallis, Assoc. I.E.E., has been elected a Fellow of the Electrical Contractors Association, of which he was president in 1950-51. Chairman and director of several firms, Mr. Wallis has a lifetime's experience in the electrical industry. A member of the E.C.A. since 1928, he has been honorary secretary of the Maidstone Branch since 1934 and has held office as chairman of the Maidstone and East Kent branches and the South Eastern Sectional Board.

Previously a generation engineer (operation) in the South Eastern Division of the B.E.A., **Mr. R. S. Atkinson,** A.M.I.Mech.E., A.M.I.E.E., has been appointed Group I generation engineer (operation) in the London Division. He succeeds **Mr. W. T. Bamford** B.Sc.(Eng.), A.M.Inst.C.E., A.M.I.Mech.E., who transfers to a similar post for Group II following the appointment of **Mr. W. Wilde,** B.Sc.(Eng.), A.M.I.E.E., A.M.I.Mech.E., to be chief generation engineer (operation) of the division. Mr. Atkinson gained early experience in marine engineering before entering the electricity supply industry in 1929 when he joined the Hull undertaking. Apart from a period of seven years with the Yorkshire Electric Power Co., he also served with Bradford, Lincoln and Rotherham undertakings. He was power station superintendent at Rotherham and on the establishment of the Authority continued to serve in that capacity until joining the South Eastern Division. Mr. Bamford has been generation engineer (operation) of Group I for about a year—previously he was station superintendent at Fulham.

Mr. F. H. Eliot, assistant for outdoor machinery to the executive officer (Electrical engineering new works development), Railway Executive Headquarters, is another who retired last month on reaching the age of 65.

The Minister of Fuel and Power has reappointed **Major H. Richardson,** O.B.E., M.C., T.D., J.P., M.I.E.E., M.I.Mech.E., F.R.S.E., as a part-time member of the Southern Electricity Board.

Celebrating the Silver Jubilee of E. K. Cole Ltd. After the presentation at Harringay Arena last Friday, Mr. and Mrs. E. K. Cole were taken over the ice in a specially decorated sleigh

At the end of last month, **Mr. C. A. Hall,** M.C., B.Sc., A.M.I.E.E., relinquished his position as manager of the Industrial Motor Sales Department of the British Thomson-Houston Co. to join the secretariat of B.E.A.M.A. Mr. Hall's association with B.T.H. dates back to 1910, and after gaining experience in the drawing office, sales and engineering departments, he joined the Newcastle-on-Tyne district office staff in June 1914. After war service, he entered the industrial motor section of the supply department, and was in charge of the section from 1937 until 1944, when he became manager of the newly formed Industrial Motor Sales Department. His wide circle of friends will wish him every success in his new position.

Mr. C. A. Hall

OBITUARY

Mr. G. P. Brown, London representative for the past 32 years of Pritchett and Gold and E.P.S. Co., Ltd., died on September 17, aged 59.

The death occurred in the train disaster at Weedon of **Mr. C. C. Howis** and **Mr. F. Walker,** both of whom were engaged on important research work at the Kirkby laboratories of British Insulated Callender's Cables Ltd., Mr. Howis being the company's chemical research laboratory manager there and Mr. Walker a research metallurgist.

Mr. J. Hiles, manager of the Installation Department of the Sunderland Forge and Engineering Co., Ltd., died recently.

Mr. A. G. H. Dent, A.M.I.E.E., of the B.E.A. Commercial Dept. at headquarters, died on September 28, aged 52.

Mr. A. F. Lee, A.M.I.E.E., chief electrical engineer of Austin Crompton Parkinson Electric Vehicles Ltd., died on September 27, aged 64.

Mr. G. C. Chelioti, a director of the General Electric Co., Ltd., and associated and subsidiary concerns, died aboard the *Pretoria Castle* on September 27, aged 62. He joined G.E.C. in 1912, starting as assistant manager of the Robertson Lampworks. Later he was general manager of the Osram-G.E.C. group of works.

Mr. W. L. Shand, M.I.E.E., who was for many years with Merz and McLellan, then on the staff of E.D.A., as representative in charge of the Electrical Section of the Building Centre, died on September 17. During the war he was with the Ministry of Supply engaged on power contracts.

Mr. J. H. Nicholls, for 30 years in charge of Ebonite Sales for Siemens Bros., and for nearly 20 years with Siemens Electric Lamps & Supplies Ltd., died on September 28, aged 62.

The Bakers' & Confectioners' Exhibition

OPENING, for the first time since before the war, the 43rd International Bakers' and Confectioners' Exhibition has taken up new and more spacious quarters at Olympia, London.

The exhibits which probably had the greatest power of attraction were the gigantic ovens, the bakery utensil washing plants and the giant chocolate enrobers which will cover anything from toffees to large cakes. Following these in popularity were the prize exhibits in the competitions.

A fact most apparent was the widespread use of electricity as the prime source of energy.

The E.D.A. stand was primarily an enquiry and advice bureau, but examples of equipment were shown. These included water heaters, a battery electric delivery van and fluorescent lighting fittings. Other new and interesting exhibits were many. These included electric vehicles by Austin Crompton Parkinson, Partridge Wilson and Smith electric vehicles, the three-deck thermo-controlled pastry oven and the latest Peel-type baking oven shown by G.E.C., the range of mixing and mincing machines shown by Peerless and Ericson and the Hobart Manufacturing Co. The latter's display included their new gravity feed slicer, the automatic dividing and moulding machine by Atlas Equipment (London) Ltd., and the Spooner patent 48 in. travelling oven, a tunnel oven built on the unit construction system.

A combination bakery machine which incorporates a cake mixer, whisking machine, almond refiner, slicing and shredding machine and a mincer, was a new unit shown by Artofex Engineering Works Ltd., whilst new units for the manufacture of biscuits included a rotary biscuit moulding machine producing biscuits of any shape or size, shown by John Pelkman Engineering Co.

A completely new machine for washing bakery utensils which is entirely automatic was shown by Concentric Mfg. Co. Ltd., and another "first-timer" was a bread wrapper for the small bakery which also completely automatic, has an output of 600 loaves per hour by C. S. du Mont Ltd.

The "Do-nut" centre, was an attraction in many ways. First time in England the "Producer" all-electric automatic doughnut machine was shown by the British Doughnut Co. It produces 200 dozen American ring doughnuts per hour.

James Stott and Co. display included a small steaming oven demonstrating automatic cooking of puddings and hams.

A 165-tray dough-retarder handling 750 lbs per day was the main feature of Marco Refrigerators display, whilst Steels Engineering Products concentrated their "Aquareg" water controller.

Cake wrapping machines, crimping machines and a fully automatic roll and bun dividing and moulding machine drew attention on the stand of Funditor Ltd.

Supply Section Visits Bournemouth

THE record of the I.E.E. Supply Section in respect of weather for its summer meetings has by no means been exceptional, but at Bournemouth last week the party was blessed by three unusually fine days. This was fortunate since the programme included two boat trips.

The first visit on Friday was to Southampton Docks, the morning being occupied with a visit to the Ocean Terminal buildings, the electrical features of which were described in our issue of August 10, 1950. The morning concluded with a boat trip round the docks, going down as far as Fawley to provide a view of the new refinery that we described a fortnight ago. After lunch the party paid a visit to the King George V graving docks and the associated electrical pumping plant. Of particular interest was the control board with its brightly coloured schematic diagram and the use of four indicator lamps to give an approximate indication of the position of the valve.

In the evening members were entertained at dinner by the Southern Electricity Board. The toast of the Supply Section was proposed by Sir John Hacking who was with the party throughout the weekend. He spoke of decentralisation of the work of the I.E.E., through its local centres and in the activities of its specialist sections. He drew a parallel between this and decentralisation in the B.E.A. and referred to the difficulties in the way of achieving that decentralisation which all hoped for. The chairman of the Section, Mr. S. E. Goodall, replied, thanking Sir John; Mr. Nimmo as host welcomed members to the Southern Area.

The visit on the following day was to Poole generating station and members had an excellent opportunity of seeing a station in the full spate of growth with two generating sets in commission and the other two at various stages in construction. Technical details of this station were given in our issue of June 7, 1951. One feature which appeared to fascinate members was a Corgi motor cycle that had been converted to battery-electric drive for the use of station personnel. Following the visit, members were guests at a luncheon given by the Southern Division of the B.E.A. They were welcomed by the divisional controller, Mr. R. H. Coates.

Sunday was occupied with a steamer trip to Cowes where members inspected the three Princess type flying boats under construction. On the way back members partook of high tea as the guests of W. T. Henley's Telegraph Works Co. and Mr. R. Davis, chairman-elect, thanked the firm for their hospitality and Mr. Goodall in particular, for the part he had played in making the summer meeting such an enjoyable one.

Telecommunication Progress

SUBMERGED REPEATERS FOR THE NETHERLANDS—DENMARK COAXIAL CABLE LINK FOR MULTI-CHANNEL WORKING

THE laying of a submarine telephone cable link between the Netherlands and Denmark has attracted recent technical interest among telecommunication engineers all over the world. Two single coaxial submarine cables of the latest design have been used for the first time over a total submarine distance of 263 kilometres (about 141 nautical miles) from Oostmahorn on the Netherlands coast, 40 kilometres north-east of Leeuwarden, across the North Sea to Romo, a small island connected by causeway to the west coast of the Jutland peninsula in Denmark. The link is the world's largest Polythene insulated, solid dielectric submarine coaxial cable, manufactured in Great Britain by Submarine Cables, Ltd., Telcon Works, Greenwich, London.

Repeater Details

Initially, two submerged repeaters have been connected to, and laid with, each submarine cable. Two separate cables have been laid as a safeguard against interruption of traffic in the event of damage due to ships' anchors, fishing trawlers, or other causes.

While it is usual in land coaxial systems to use one tube for transmission in one direction and a second tube to complete the circuit with transmissions in the opposite direction, effective safeguarding of the service in this type of two-cable link necessitated each cable being used for transmission in both directions.

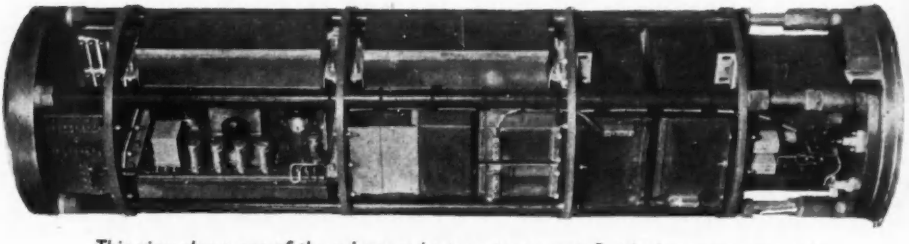
With two submarine repeaters in each cable, a total of 36 complete telephone circuits have accordingly been provided over each single coaxial cable.

Among features of the submerged repeater design which are of particular interest is the fact that transmissions in both directions are amplified by the same amplifier. In the Netherlands to Denmark direction the 36 telephone channels, with a carrier spacing of 4 kc/s as recommended by the C.C.I.F. occupy the frequency band 24 to 168 kc/s, while in the opposite direction of transmission their counterpart of 36 channels occupy the band from 208 to 352 kc/s. The 40 kc/s displacement between these two directional bands is employed in the repeaters to discriminate the direction in which each is transmitted after amplification by the common amplifier. This is done by means of high-pass and low-pass filters.

Power Supplies

Another interesting feature of the submerged repeater design is the method by which it obtains the power supplies necessary for its three-stage amplifier. Power supplies to the submerged repeaters are derived through the central conductors of each coaxial cable from a battery supply of about 260 volts at Oostmahorn operating in conjunction with an accurately regulated rectifier voltage of about 280 V at Romo, the circuit in each case being completed by a sea earth. In the repeater itself, power separation filters specially designed for the purpose segregate power from signals and the voltage drop of 220 V across the valve heater supply circuit is employed as anode voltage. In this connection it is interesting to note that the submarine cable can tolerate a voltage of up to 1,500 V to earth.

The number of circuits to be obtained from the cables will first be increased to 120 for each cable. This extension of facilities is a long-term plan in several stages which envisages more than the present two submerged repeater points in each cable, operating with different bandwidths from the initial installation.



This view shows one of the submerged type repeater units with the covers removed

Yorkshire Board Summonses

IN the summonses against the Yorkshire Electricity Board, its chairman, Col. W. M. Lapper, and deputy chairman, Mr. F. Newey, alleging the overspending of £41,000 on the Board's headquarters at Scarcroft, the hearing of which began last week, Mr. J. M. Dodds, secretary and legal adviser to the Board, in the course of his evidence, said that although a procedure for the authorisation of capital expenditure of over £10,000 was agreed upon, he did not think it was strictly followed in regard to this work. A target date for termination of the work was fixed because of the expiry of the Bramhope lease, and for the official opening by Lord Citrine while at the B.E.P. Conference at Harrogate. In December, 1950, after inquiries by the Ministry of Fuel and Power, he advised Col. Lapper that the work should be stopped. But it was not stopped. By December 29, the total expenditure at Scarcroft was nearly £100,000, including building work of £70,000, and the chairman referred to overtime, weather conditions, under-estimating and unexpected defects as being contributory factors.

Evidence of receiving an application for authorisation of building work at Scarcroft, costing £13,500, was given by Mr. E. G. McKenzie, formerly a principal in the electricity department of the Ministry of Fuel and Power. An application from S. R. Siviour, the then chief engineer of the Board, concerning an extension to headquarters at a cost of £32,000, was approved. This included building, heating, painting, wiring and lighting. But no authorisation was granted for building work at Bramhope or for a tractor shed and loose boxes at Scarcroft—application for this was made only on January 23, 1951.

Control of the work on the extension at Scarcroft was largely by Mr. Appleyard, an architect, under the direction of the chairman and deputy chairman, Mr. S. R. Siviour stated, but the whole trouble was that everybody at Scarcroft was being grossly overworked. The whole course of the work was being carried out at a speed above that one would normally expect, in order to provide a convenient date for certain essential requirements, the primary one being the accommodation of the engineering department prior to expiry of the Bramhope lease.

Continuing the case for the prosecution, Mr. L. T. Appleyard, in reply to questions by Mr. Cumming-Bruce, said that in preparing drawings of the proposed extension at Scarcroft, he received direct instructions from the chairman to exclude all electrical work, including heating, as that would be done by the Board's staff. His plan was for a separate building as a canteen or dining room, but an M.o.F. representative suggested that the canteen should be incorporated in the main building. Witness told the chief engineer that the estimated cost of £32,000 was of building work only. Subsequently he was instructed by the chairman to omit some stanchions, and raise the brickwork to increase the room height. Floodlighting was introduced and during the winter a great deal of overtime worked, although in his estimate of £32,000 he had made no allowance for overtime. Later he agreed that some of the work was "borderline" as far as authorisation was concerned, and that it was never the functional responsibility of the chairman or deputy chairman themselves to make application—they decided policy and gave instructions. Mr. J. D. Nicholson, who succeeded Mr. Siviour as chief engineer to the Board, stated that when he took over in August, 1950, the work at Scarcroft was being finished off. He did not consider the responsibility of this work as his. The hearing continues.

NEW LITERATURE

A.C./D.C. Test Meters

by W. H. Cazaly and Thomas Roddam

MOST radio enthusiasts have at some time toyed with the idea of making their own multi-range meters. Some have actually completed the job, more or less successfully; others have found well-nigh insuperable snags. Here however is a book which deals with the subject both from a practical and a theoretical viewpoint. It is mainly devoted to the construction of the a.c./d.c. multi-range meter using a rectifier circuit for the a.c. scales. Details are given of transformer and resistance bank construction including such items as wire sizes, lamination details, turns ratio, and, more important, suggestions are made as to the manufacturers to approach for the items.

Once the basic instrument is built, the necessary additional work to add special ranges such as power, capacitance and resistance can also be carried out with the aid of the information given.

The authors explain in detail each step and the book will prove most useful for all interested in meters. Published by Sir Isaac Pitman and Sons, 180 pages, 4¾ in. x 7¼ in. Price 18s.

The Practical Electrician's Pocket Book 1952

edited by R. C. Norris

ALL the well-established and popular features are retained in the fifty-fourth year of publication of this work. Amongst the points more especially noteworthy are new notes on private generating plant, and on the ring main system of domestic wiring, together with an additional article on cables for sound distribution systems. Notes on phase conversion will also prove helpful to many electricians. Published by Electrical and Radio Trading, 566 pages, 5¼ in. by 3¾ in. Price 5s.

The BUYER'S *Column*

Price Increases

AS from October 1 the price of all deliveries of Model 400 electric cleaners supplied by THE HOTPOINT ELECTRIC APPLIANCE CO., LTD., Crown House, Aldwych, W.C.2, will be: Electric cleaner, £15 plus £7 10s. purchase tax; attachments will cost £3 10s. plus purchase tax £1 15s.

October 15, however, is the date when the price of the electric washing machine EW/50, supplied by PARNALL (Yate), LTD., 43 Park Street, London, W.1, will be increased from £42 15s. plus £21 7s. 6d. purchase tax to £45 10s. plus £22 15s. purchase tax. The extra charge for the supply of a d.c. motor in the machine remains unchanged.

The Third Arm

FEVERISHLY groping in darkness for the torch which has rolled away from where we propped it, straining to work one-handed holding a torch in the other, gripping the torch between the knees or in the teeth—and dropping it at the critical moment—while we work on the car, the refrigerator, the fuseboard or any location where a torch is a necessity—have we not all experienced it? And have we not wished either that we had three arms or that the torch had legs and would stand and throw the light where we want it? A new device recently patented by MR. C. W. DENNY, of 8 Beamont Court, Sutton Lane, Chiswick, W.4, provides the answer to this problem in providing a small hinged stand which, when not in use, hinges up round the torch so as to be quite out of the way. In use it provides a stable stand, and since the torch is supported at its approximate centre of gravity, it will balance in any direction. Four types have so far been standardised, for large torches (1½ in.) either parallel or large reflector pattern, and small (1⅛ in.).

Uses for Tufnol

PUBLICATION of a new booklet under this title by TUFNOL, LTD., Perry Barr, Birmingham, 22B, brings into focus the uses of this unique non-metallic material.

Resembling horn or hardwood in appearance, Tufnol possesses many of the advantages of metal but few of its disadvantages. It presents a valuable combination of chemical resisting, electrical insulating, and mechanical properties to such an extent that components made from this material have been found to give excellent service in situations where other materials have been useless.

Tufnol is supplied in sheet, tube or rod form. It is half the weight of aluminium and machines more easily than metal. As a material for gear wheels it complies with B.S. 972/1941 and satisfies the requirements of B.S. 668/1936. It is admirably suited to such uses as bearings, handles, pistons, insulators, instrument panels, nuts and bolts, cores, bobbins, brush bars, slipring housings and a host of other uses where its principal properties render it invaluable.

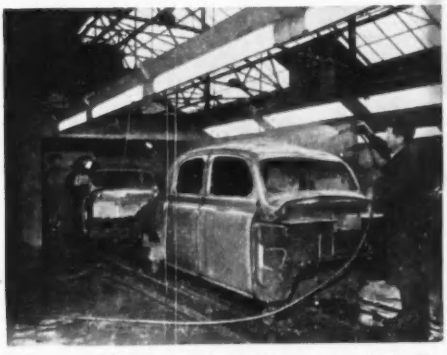
The booklet is available on request to manufacturers and others who have a genuine interest in the use of Tufnol.

Spray Gun "Bonderizing"

RECENTLY added to the range of metal pre-treatment and rustproofing processes marketed by THE PYRENE CO., LTD., of Great West Road, Brentford, Middlesex, is a "Bonderizing" development utilising a cold-processing solution which is applied to sheet metal by means of an ordinary paint type spray gun.

The advantages of the well-known and widely established "Bonderite" pre-treatment have now been made available to the specialist and small-scale manufacturer whose production circumstances do not warrant the installation of orthodox "Bonderizing" plants. The new process is not an alternative to any of the established systems of "Bonderite" treatment in current use, but is an extension of them.

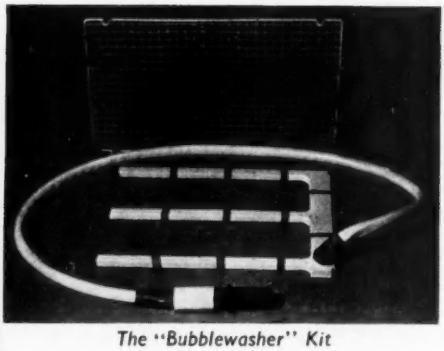
"Spray Gun Bonderizing," which is intended for use only on good quality sheet steel, does not call for the provision of any special equipment, nor does the process necessarily demand the provision of space solely for the work. Where, however, there is a steady flow of production to be treated, it is advantageous to have a spray booth



Spray gun "Bonderizing" in progress on the bodywork of Singer SM 1500 cars

(preferably of the water-conditioned type) allocated to the "Spray Gun Bonderizing" operation.

The phosphate coatings produced on steel surfaces by "Spray Gun Bonderizing" possess the same paint-bonding and corrosion-resisting qualities as those obtained from orthodox "Bonderite" treatments, and a similar sequence of operations is employed.



The "Bubblewasher" Kit

The "Bubblewasher"

A HOME washing device which was recently put on the market by the OVERSEAS ENGINEERING CO. LTD., 200 Bishopsgate, E.C.2, involves the use of the air expelling fan of a vacuum cleaner.

Claiming that his invention, the "Bubblewasher," is 100% safe and efficient in use, Mr. Richard Wolf, the patentee, uses the air expelled from a cylinder-type domestic vacuum cleaner to cause a "boiling" effect in the hot water, which he claims causes large quantities of soapy lather to be eased through the clothing, thus removing the dirt.

Basically, the apparatus comprises an enamelled trident which rests in the bottom of a normal sink. In the forks of the trident are the air holes protected by wire mesh. To the trident is coupled a six-foot length of rubber hosepipe which is connected with the hose of the vacuum cleaner by a specially designed connector supplied. The clothes are immersed in hot, soapy water in the sink and are held down by means of the mesh guard, also supplied, and the vacuum cleaner motor switched on.

A ten-minute wash is claimed to be all that is required, when the sink is refilled with clean hot water and "bubble-rinsed" by the same method.

The price at which the device is marketed is £4 8s. (tax paid).

Mullard Valves for 16 mm Talkies

THE introduction by MULLARD LTD., Century House, Shaftesbury Avenue, London W.C.2, of a range of efficient miniature valves and photocells has recently made possible considerable advances in the design of 16 mm sound-on-film equipment in this country.

Developments in this field have reached a stage where it is possible to produce extremely compact, light-weight and easily transportable cinema equipments which can be erected by any semi-skilled projectionist in a matter of a few minutes.

Mullard valves and photocells, specially suitable to meet these requirements, comprise the following types:—EF40 A.F. Pentode (amplifier); ECC40 Double Triode (phase splitter, etc.); EL41 Output Pentode; EZ40 I.H. Full-wave Rectifier; 52CG, 55CG, or the new miniature 90CG Photocells.

The average magnetic hum level of the EF40 is notably low, being of the order of 5 μV. This and extremely good microphony characteristics are due, among other things, to the bi-filar heater used and the rigid, all-glass construction employed. To take full advantage of the low-hum characteristics of the EF40, however, it is desirable to use valve-holders made of materials which have a high insulation resistance.

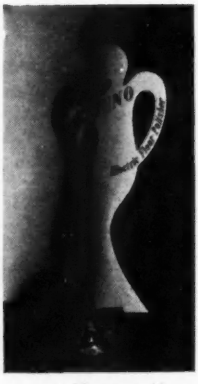
A typical valve line-up consisting of a single EF40 as voltage amplifier, followed by an ECC40 double triode as voltage amplifier/phase-splitter driving two EL41 pentodes in push-pull, is capable of providing an output of 10-12 watts.

The EL41 is also suitable for use as an oscillator for energising an exciter lamp of the 6 W class at radio frequency. Some makers of 16 mm sound-on-film projectors use this system to reduce weight and at the same time overcome the possibility of hum being caused by the exciter lamp operating at mains frequency.

Many of the British 16 mm sound-on-film equipments recently built around this series of Mullard valves and photocells measure less than 12 in. by 6 in. by 12 in. Sound projectors of this kind are introducing a new phase in cinematography.

"Juno" & "Hortense"

AN unusual window display piece for "Juno" domestic electric floor polishers is now available from TRUVOX ENGINEERING CO. LTD., Exhibition Grounds, Wembley.



"Hortense"

It is a full-sized figure known as "Hortense," and is available on request to dealers for short period window displays.

"Hortense" is a futuristic character in two-colour shading with black lettering, and is supplied in two parts for easy packing. Simple yet, striking, "Hortense" will, it is hoped, attract considerable attention wherever displayed.

Dealers who are interested in this display may 'phone the Truvox Sales Office at Harrow 4455.

THE WEEK

COMMERCE *in news* INDUSTRY

O.E.E.C. Restricts Use of Copper

THE 18 countries that are members of the O.E.E.C. have decided on joint action to restrict the use of copper for non-essential products. It has been agreed that the use of copper, or of copper alloys, containing 40% or more of copper in weight, will be prohibited in the manufacture of over 200 commodities. These will include electrical appliances and refrigeration equipment. Exceptions for home markets may be allowed in special cases if the national economy is likely to be injured by the restriction. It was also decided by the 18 nations not to export commodities on the prohibited list to each other. These measures came into force last Monday.

Export Restrictions Continued

AN announcement by the Board of Trade last weekend has extended the export restrictions on semi-manufactures of copper and its alloys for a further period of three months from the end of September. For the two quarters since April 1, these exports have been restricted to about half the rate prevailing in the first six months of 1950. The Board explains that this is due to the continuing world shortage in the supply of raw materials and the great demand for these semi-manufactures for essential purposes. It adds that another announcement will be made before the end of the year. In regard to the export of semi-manufactures of zinc, this will continue to be allowed only in exceptional circumstances.

Coincidental with the above decision, the International Materials Conference in Washington has made its first allocation of copper and zinc. Of the 36 countries to receive allocations, the U.S. easily heads the list, but Britain takes second place, receiving 91,690 tons of copper and 6,250 tons of zinc. The allocations have been based primarily on defence requirements and stockpiling.

East Midlands Industrial Tariff

THE new standardised industrial tariff of the East Midlands Electricity Board, to which we referred last week (p. 584), provides for a monthly maximum demand charge of 10s. for each of the first 500 kVA of m.d., 8s. 4d. for each of the next 500 kVA and 6s. 8d. for each additional kVA of m.d. The unit charge is 0·48d. p.u., together with a fuel clause providing for a reduction or increase by 0·0008d. for each penny by which the fuel cost is more or less than 38s. per ton. This tariff is for large industrial users where motive power is the main item.

Smaller consumers (usually not exceeding 100 kVA of m.d.) taking supplies from medium or l.t. mains are offered two tariffs—"B," comprising a monthly charge of 10s. per kVA of m.d., plus 0·58d. p.u. with coal clause as above, and "C," 1¾d. p.u. for first 3,000 units p.q., 1⅝d. p.u. for the next 3,000 and 1½d. p.u. all over 6,000 units p.q. As we noted last week, under these tariffs, which apply from the first meter reading from March 25, lighting supplies to industrial consumers will be charged at the general rate provided that the main use is for motive power.

Maximum Prices of Sulphuric Acid

AN order permitting increases in the maximum prices of sulphuric acid has been made by the Ministry of Materials. It came into effect on Monday. The additions are 14s. per ton on weak acid, 77% H_2SO_4, and 27s. per ton on strong acid, more than 84·02% H_2SO_4. They are stated to be due to the rise in the price of imported pyrites and in freight rates for both pyrites and sulphur.

Power Cut Warnings

AGREEMENT has been reached between the B.E.A. and B.B.C. whereby the long-wave transmitter of the Light Programme will be made available to give warnings of danger of electricity cuts to individual factories. The two undertakings are examining the technical arrangements which this involves as a matter of urgency, and a further announcement will be made when details have been finalised. This announcement by the Ministry of Fuel and Power last weekend followed the statement that similar arrangements have been made by the London Electricity Board with four radio-diffusion organisations in the London area, whereby radio programmes will be interrupted to give immediate warning of imminent power cuts. It is estimated that some 11,000 of the 140,000

The First Half-Century

A large number of people attended the inauguration of the Battersea Borough Council's electric supply undertaking. The station buildings, though handsome in appearance, were not built with an eye to acoustics, and this and the hissing of engines combined to render several speakers almost inaudible. Ald. J. E. Livesey, chairman of the Lighting Committee, stated that the electric supply scheme had been before the Committee for about eight years. There had been some objection raised to the magnificence of the station buildings, but he thought the money had been well spent.—*From our issue of October 3, 1901.*

One of Ontario Hydro's four helicopters hovering over a 220 kV transmission line during a routine patrol

subscribers of the radio-diffusion organisations are industrial consumers, and the agreement would enable them to receive warning within 30 seconds of the necessity arising, and up to seven minutes before the cut. This was announced following a meeting last week of the London and S.E. Regional Board for Industry which met to consider replies from commercial and industrial consumers about their plans to reduce peak period demands by 20% this winter.

Scientific Staff win Pay Claim

AN increase in the minimum salary for scientific and technical workers in the engineering industry, and an extension of the agreed scale to cover employees up to 25 years of age, has been granted by the Industrial Disputes Tribunal. The claim was put forward by the Association of Scientific Workers who submitted that the principle of a fixed national minimum scale of wages for technical and scientific workers in the industry of over 21 and up to 25 years of age was sound and in the best interests both of the employees and the industry.

The Tribunal agreed that the minimum weekly salaries (inclusive of allowances) should be:

Age	*London*	*Provinces*
	£ s. d.	£ s. d.
21	6 5 0	6 0 0
22	6 12 6	6 7 6
23	7 0 0	6 15 0
24	7 7 6	7 2 6
25	7 15 0	7 10 0

These rates shall apply as from the first full pay period following September 14. The Association also made two other claims (*a*) for a salary of not less than £400 p.a. (including allowances) for scientific staff holding a university degree, contending that the broad training of such personnel enables them to tackle the various problems without delay; and (*b*) for a salary of at least £600 p.a. for staff who are corporate members of a chartered professional institution. The Tribunal found that these two claims were not established.

Inspecting the Grid

CHECKING and watching the many miles of grid lines is one of the arduous tasks of electricity supply engineers in any country. The vast expanse of the Canadian mainland probably presents an even greater problem in this respect than in many other lands, but the Hydro-Electric Commission of Ontario has solved the difficulty to a large extent by the introduction of four helicopters. These machines carry out regular patrol flights and in the accompanying illustration one of the Commission's aircraft can be seen hovering over a 220 kV transmission line between Chats Falls generating station on the Ottawa River and Leaside transformer station, Toronto.

Full Diary of Events

E.I.B.A. committees in the various areas throughout England are busy organising their annual dances, carnivals and balls, most of which are to take place between now and Christmas. The big date on the social calendar is November 9 when the Association's annual ball is to be held at Grosvenor House, Park Lane, W.1. Friday,

A new application has been found for fluorescent lamps and fittings. The lighting provided by British Thomson-Houston reflector fittings, both in colour and intensity, was found adequate for experiments in colour television being carried out here by Pye Ltd.

Two sections of the London to Bath trunk road, at Slough (left) showing "cut-off" lanterns housing 250 W mercury lamps, and at Maidenhead (right) with 400 W lamps in "Viatron" lanterns. Equipment was supplied by the General Electric Co.

October 12, is also a big day, for three areas hold their annual events then. Gloucester's annual ball will be at the Bell Hotel, North Staffs' buffet dance at Ash Hall Hotel, Stoke, and Birmingham's carnival dance at the G.E.C.'s Magnet Club, Witton. Other fixtures, in date order, are Sussex Centre's ball at Worthing on November 2, the N.E. Area's ball at Newcastle on November 28, the E. Midlands ball at Leicester on December 6, and Manchester's ball on the following day at the Midland Hotel.

Bath Road Lighting

THREE sections of the London to Bath trunk road at Maidenhead and Slough have received the attention of lighting engineers in recent weeks. All were equipped with mercury lighting and two types of G.E.C. lanterns were employed. At Castle Hill, Maidenhead, a total of 44 "Viatron" lanterns housing 400 W lamps were installed and mounted on concrete columns supplied by Concrete Utilities. A similar installation of 28 "Viatron" lanterns was carried out at Slough, while a third section of this road in the same borough has been illuminated by 38 of the same company's "Cut-off" lanterns housing 250 W lamps. In these latter schemes also, Concrete Utilities' columns were used.

Another Scottish Invitation

SCOTTISH members of the Electrical Wholesalers Federation have again invited the Council to hold its meeting in Scotland. The venue this year is the Turnberry Hotel, Ayrshire, and the Council meeting began there yesterday (Wednesday). Today's activities include the golf competitions in which members of E.L.M.A. and R.C.M.A. joint negotiating committees have been invited to participate. This evening the Scottish hosts are to entertain the visitors to a dinner and dance.

Trolleybus Debut in Brisbane

HAVING referred last week to the first diesel-electric locomotive to run on the South Australia Railways, we hear of another debut, made in Queensland this time, by a new fleet of trolleybuses.

The first of Brisbane's 30 new trolleybuses now on regular service in the city. Electrical equipment was made by the British Thomson-Houston Co. Ltd.

Brisbane saw its new trolleybus for the first time a short while ago when it went out on a trial run, but it has since been put into regular service, together with eight others. When proposed extensions to the route have been completed, a total of 30 vehicles will be in operation. All these will be manufactured by the Sunbeam Trolleybus Co. with electrical equipment made by British Thomson-Houston Co. Ltd.

Plea to Publicise Contracts

A RESOLUTION urging the B.E.A. to make more information about contracts let available to the public, was passed by the National Chamber of Trade Autumn Conference on Monday. The resolution viewed with concern the Southern Board's refusal to supply such information. Proposing the resolution, a delegate asked what could be more annoying to an enterprising contractor than ignorance as to why his tender had been passed over?

Newport Electric Club Proposed

ELECTRIC Clubs are becoming increasingly popular. Following the formation of such clubs in Exeter and Plymouth in recent months, we hear

Two photographs taken at the E.I.B.A. golf championship last week show (right) the winners with Sir Henry Self and some of their less fortunate competitors, from left to right are G. F. Sills, J. S. Davies, J. W. Braithwaite, Sir Henry, R. E. Prickett, E. McCabe and W. Sharpe. Below, Sir Henry presents the Sir Montague Hughman trophy to J. W. Braithwaite, watched by the championship secretary and organiser, W. J. Bird

this week of a similar movement in Newport, Monmouthshire. An inaugural meeting has been arranged to take place on October 15 at the Tredegar Arms Hotel. Membership will be open to those engaged in any branch of the electrical industry, including electricity supply authorities, manufacturers of electrical equipment, wholesalers, contractors, works engineers and Post Office and radio engineers. It is hoped that one of the past-presidents of the flourishing Birmingham Electric Club will attend and address Newport's first meeting.

Gift to Science Museum

A DEMONSTRATION model of the Varionic drive has been donated to the Science Museum in London by the makers, Nevelin Electric Co. and Lancashire Dynamo and Crypto (Mfg.) Ltd. This equipment has found an important place in industry today and the manufacturers' gesture will undoubtedly be appreciated by students, who will find that the method of presentation adopted by the museum authorities and the description accompanying it, gives a ready understanding of the equipment's use. We understand that it has already attracted a deal of attention not only from the more serious-minded public, but also from small boys who delight in pressing the buttons.

E.I.B.A. Golf Championship

DESPITE some depressing weather, the E.I.B.A. National Golf Championship produced some good golf and much enjoyment when competitors assembled for the two-day meeting at Southport and Ainsdale Club early last week. On the Monday the Veterans' Trophy was won by Mr. G. F. Sills, formerly N.W. manager of English Electric, with a net score of 78. Deputy chairman of L.E.B., Mr. E. A. Mills, was runner-up with 83 net. Mr. J. Trimble of the Merseyside and N. Wales Board won the Visitors' trophy, the other competition to be held that day, with a net score of 71.

The National Championship itself took place on Tuesday and the coveted Sir Montague Hughman trophy was won by a Cambridge University student of engineering, Mr. J. W. Braithwaite, with a net score of 74. Mr. E. McCabe of B.E.A., Southern Division, was runner-up (75 net). The best Scratch Score Trophy went to Mr. J. S. Davies (85) a Liverpool electrical contractor and the Foursomes Bogey Competition was won by W. Sharpe of Berry's Electric Co., and R. E. Prickett of B.I.C.C. who finished all square. During the dinner on Monday evening, Mr. J. Eccles, chairman of E.I.B.A., committee in the Merseyside and N. Wales area, presented a cheque for £577 10s. as that year's contribution to E.I.B.A. funds from this area, which sum, incidentally, constituted a record so far for any area. Prizes for Monday's contests were presented by the Association's president, Mr. C. R. King, and Sir Henry Self carried out the same function on Tuesday evening for that day's events.

Marconi Yacht continues Tour

HAVING been weatherbound at Falmouth, Marconi's research yacht "Elettra II" has now continued its tour of west coast ports. She called at Cardiff and Milford Haven last week and will be at Liverpool, open to Merseyside shipping interests, until tomorrow. The remainder of the yacht's itinerary comprises a trip to Dublin where she will be available for inspection for three days as from Tuesday next; Belfast, for three days from October 16; and Glasgow during the week beginning October 22.

Ekco Window Display Card

FURTHER to our note a fortnight ago concerning Ekco-Ensign lamp publicity campaign, we

note that another display card featuring the company's "double-life" and fluorescent lamps, is now ready for distribution to stockists. Standing three feet high it is silk-screen printed on hardboard, the board being fitted on a strong wooden framework. The design has been based on the advertisement appearing in the national Press throughout this winter's campaign and the complete unit forms the main feature of the Ekco-Ensign window display service.

Batti Wallahs hear Radio Doctor

FIRST luncheon of the season was held by the Batti Wallahs Society on Wednesday of last week with Sir John Hacking in the chair. The principal guest was Dr. Charles Hill, M.A., M.D., LL.D., M.P., better known to the man in the street as the "Radio Doctor" who, in his own inimitable style gave some reminiscences of his career in medicine, radio and politics.

Prizes to be Won

MEMBERS of the A.S.E.E. are again invited to submit papers in the annual competition for the W. E. Highfield shield. This is the 23rd year that the competition is being run, and in addition to the trophy there are cash prizes of ten, five and three guineas. The shield is awarded for the best paper of 2,000 words on subjects connected with the electrical industry and/or the Association, and it may be an encouragement to intending competitors to note that the object of the contest is to encourage papers of a practical nature and original thought—the literary style being of secondary importance. The Association also invites entries in the fifth annual competition for the Thurston award, comprising a silver trophy and £10 in cash. This is given for the invention or idea judged to be the most valuable contribution to the advancement of the utilisation of electricity or the improvement of distribution or installation technique. Closing date for both competitions is March 31, 1952.

Film on Electric Motors

A NEW 35 mm filmstrip showing how the science of electronics has been applied to improve quality and production in the manufacture of electric motors has been prepared by Brook Motors. It deals with the use of the thermionic valve, the cathode ray tube and the photo-electric cell as applied to testing equipment employed in the various stages of motor production. The film has a running time of 40 minutes and its 22 frames comprise photographs taken in the company's Empress works at Huddersfield. It can be purchased or borrowed on application to Brook Motors' film library.

NEWS IN BRIEF

The fourth annual dinner of the London Power Staff Reunion Association will be held on November 29 at Bridge House Hotel, S.E.1. Details and tickets from H. C. Mudie at Ergon House, Horseferry Road, Westminster.

City councillors of Odense, Denmark, and councillors of St. Albans visited the Longacres factory of Marconi Instruments and toured the company's permanent housing estate recently.

About 100 members and friends attended the first dance of the season organised by Sloan Electrical Co.'s social committee a week ago.

Yorkshire Copper Works, Ltd., Leeds, are showing their new films "Yorkshire in the Making," "The Yorkshire Way," "Yorkshire on Special Service," at Radiant House, Bold Street, Liverpool, on October 12. Admission is by ticket only.

Eastern Electricity Board's Northmet sub-area held their annual swimming gala recently. Besides the races, the programme included a diving display, a full-dress race and a water polo match against the Gas Board which was drawn.

Mr. John L. Brook, joint managing director of Brook Motors, distributed certificates, medals and special prizes and awards to apprentices at a small ceremony recently

C. C. Wakefield have announced that essential lubricating oil additives, formerly obtained from dollar sources, are now being produced on a large scale by the new Castrol plant at Stanlow, Cheshire.

Over 60 Henley pensioners, some with over 50 years' service to their credit, spent a day at Margate last week with Sir Montague Hughman, chairman, and other senior Henley officials.

The factory acquired by Sunvic Controls Ltd., on the new industrial estate at Harlow, Essex. This company's works and offices, previously situated in Long Acre, W.C.2, have now been removed to Harlow where production has already started. The Long Acre premises are now occupied by the sales department, while the registered office remains at 10 Essex St., W.C.2. Harlow's new estate was opened on September 24—there are seven factories in operation there at the moment, seven more are under construction and a further eight are being planned

Electric Supply News

Carlisle

The proposal of the B.E.A. to erect a 275 kV transmission line from Blaydon-on-Tyne to Carlisle was the subject of a Ministry of Fuel and Power inquiry at Newcastle last week. An alternative route advocated by several societies objecting at the inquiry is via Chopwell, Ebchester and Slaley. Mr. G. A. Thesiger, K.C., for the Authority said that the proposed line, 51 miles long, would form a vital link in the new grid transmission system, linking England and Scotland. Existing lines were seriously overloaded. The route proposed was the shortest and would cost £13,000 a mile. Existing roads provided easy access for construction and maintenance, and the land was under 800 ft, which lessened the risk of icing and weather damage to the lines. They had tried to avoid farm land, and the route was planned to affect the amenity interests of the Roman Wall as little as possible. The southern route, proposed by objectors, ran over very exposed and high ground, he said, increasing the risk of breakdown in winter. Mr. F. J. Lane, O.B.E., M.SC., M.I.E.E., stressed that by using Newcastle generating plants to feed into the Cumberland area in off-peak periods, it would be possible to save £132,000 annually in coal. Mr. M. J. Smith, o.h. design engineer, stated there would be 280 pylons, 115 ft high. The suggested alternative route would cost another £83,000, and increase transmission costs by £1,000 annually. The National Parks Commission agreed that the most satisfactory route, from the amenity point of view, was that well south of the Tyne, but if it was impracticable the Commission considered that the route proposed by the Authority was the least damaging alternative. Although recognising the need for the line, the C.P.R.E. also advocated the southern route, but for Northumberland C.C. it submitted that the construction of engineering works on the edge of a national park was at variance with the whole idea of preservation. But Mr. J. F. Shipley, consulting electrical engineer, denied that the southern route would increase the risk of icing. The inquiry was closed.

Eston

The Urban District Council considers that the North Eastern Electricity Board's charge of 1s. 9d. for mending a fuse is "a bit steep," and is to keep in mind the possibility of carrying out its own electrical repairs in council houses. One member, at the recent meeting, suggested it might be better to run evening classes to instruct tenants how to put in a fuse. It was pointed out, however, that the Board could offer a 24-hour service while the council's one electrician could only undertake work at certain times. After discussion it was decided that, in fairness, the council could not expect to do the profitable work themselves and leave the Board to do the rest.

Exmouth

The question of the South Western Electricity Board's refusal to lay underground cables on new estates except at a cost of about £10 a house, is to be taken up by the Devon Urban District Councils Association. The Exmouth U.D.C., at its recent meeting, has urged the Association to raise the matter because it seemed to be the Board's policy throughout the area to supply new estates by means of o.h. lines.

North Western

Rishton Council recently objected to an application by the North Western Electricity Board to the Ministry of Fuel and Power for permission to erect an overhead supply line from Whitebirk power station across Blackburn Road, the Council's objection being on "amenities" grounds. The Board has now submitted an additional application to the Ministry for an overhead line from Whitebirk to Darwen. The Council has now lodged a further objection.

Ryton-on-Tyne

The Tyne Improvement Commission has granted an application by the British Electricity Authority to construct a transmission line across the Tyne between Ryton and Newburn. The line will carry six conductors for carrying a three-phase current of 132,000 volts. There will be a tower on either side of the river some 1,095 ft apart.

LIGHTING SCHEMES

Ashby-de-la-Zouch —The M.o.T. has approved plans for Class "A" street lighting for the U.D.C.

Bognor —A Highways Committee proposal to spend £1,676 on the installation of fluorescent lights in the residential part of London Road was referred back to the committee, at last week's Council meeting.

Haslemere —As the M.o.T. has not approved the installation of fluorescent lamps on the main roads, except for 11 in High Street, the Council has agreed to use sodium lighting on main roads. Application is to be made for sanction to borrow £11,000 for the purpose.

Horbling (Lincs).—The parish council has approved a plan for street lighting.

Market Harborough —M.o.T. consent is sought by U.D.C. to £8,666 street lighting improvement scheme for the town centre. Mercury vapour lamps will be installed in a section of A.6 trunk road, and 3-tube fluorescent lighting on a section of High Street and St. Mary's Road.

Sutton-in-Ashfield (Notts) —The U.D.C. is applying for consent to instal improved lighting on Alfreton Road, Huthwaite Road, Sutton Road (Huthwaite) and Mansfield Road, at a cost of £6,412.

Woodville (Staffs).—The Parish Council has decided to ask the East Midlands Electricity Board for an estimate of the cost of improving lighting along the main thoroughfare.

Company Activities

Baghdad Light and Power Co.

For 1950, the profit, after allowing for all charges, including taxation, amounts to £140,429 compared with £111,826 in the previous year. Taxation absorbs £125,000 (*£148,000*). The Ordinary dividend is again 7%. To reserve to finance capital expenditure £100,000 (*£75,000*), and there is £10,796 (*£6,516*) carried forward.

E. K. Cole Ltd.

Capitalisation of £50,000 from the £500,000 general reserve for a capital bonus of 200,000 5s. Ordinary shares is proposed by the directors. The chairman, Mr. E. K. Cole, has waived his right to an allotment in respect of his holding of Ordinary stock, and the new shares will be allotted to the Ordinary holders in the proportion of one for every £1 of stock held on October 5. A meeting is called for October 17.

General Electric Co.

Strong objection, on principle, to the taxation of profits which were retained in the business, and used for the purpose of increased economy, production and expansion, was a feature of the speech of Sir Harry Railing, chairman and joint managing director of the company, at this meeting last Thursday. On these profits the life-blood of industry depended. Without them industry must wither and decay, he said. The heavy burden of taxation on undistributed profits constituted a capital levy on savings, and since it taxed profits without allowing for the increased cost of replacement of stock and fixed assets, the capital assets available for maintaining efficient production were drastically curtailed. Dividend limitation had reduced the possibility of attracting outside finance, so where then was the capital to come from? he asked. He then went on to summarise the present position of the electricity supply industry, which he considered a perfect example of the necessity of sufficient capital resources. The present shortage of plant could not be laid at the door of the B.E.A. administration. It was almost entirely due to the fact that the post-war Government did not recognise—or did not have the strength to insist upon—the necessity of providing nearly enough sufficient capital for electricity supply. The U.S.A. provide 6,500 MW of additional plant per year for a population of 150 millions. Our proportional programme in the U.K. should therefore exceed 2,000 MW, leaving out of consideration our present grave deficiency. Yet the programme for three years hence falls 25% short of this figure. This state of affairs is a glaring example of what is bound to happen if the demands for essential industrial capital are subordinated to claims for other forms of expenditure, however desirable they may appear. He warned the Government that their demands on the nation could not be capable of fulfilment unless all possible consideration was given to the provision of adequate power supply. Turning to the company's position, he mentioned that a great proportion of its research facilities had been diverted to the rearmament programme, and most of the works had received orders from defence departments. The demand for domestic consumer appliances throughout the world was undiminished, but, since that ranked last in priority, scarcity of raw materials prevented them doing justice to it.

Sturtevant Engineering Co.

With the interim dividend of 5¼% tax free, a one-for-six scrip bonus is also announced. The distribution of 197,256 new 5s. shares will capitalise £49,314 from general reserve. The new shares will not rank for the interim dividend.

Dividends Declared

A. C. Cossor.—Payment of one year's arrears of dividend to holders of 6% Preference, bringing it up to March 31, 1950.

Drayton Regulator Co. (*Holdings*).—Interim dividend of 10% (*same*).

W. T. Henley's Telegraph Works Co. Ltd.—Interim Ordinary dividend of 5%.

Lacrinoid Products.—Interim dividend of 5% (*nil*).

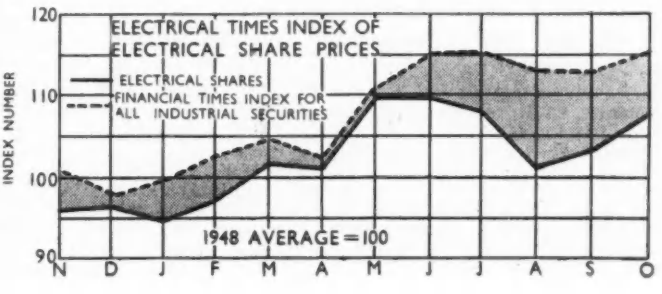
Metropolitan Electric Cable and Construction Co.—Interim of 10% (*same*).

Superheater Co.—Interim of 10% on Ordinary and "A" Ordinary (against 15% on smaller capital).

Telephone and General Trust.—Final dividend of 17½%, making 35% (*both same*).

C. C. Wakefield and Co.—Interim Ordinary dividend of 10%, payable on December 1.

Share prices last month resumed the levels as at the end of June. At the end of September they had risen appreciably during the month—the "Financial Times" index for all industrial shares showed an increase of 2·5 to 115·3, while the "Electrical Times" figures rose from 103·6 to 107·5. Figures are based on average prices during 1948



Commercial Information

CONTRACTS OPEN

HOME

Oct. 5.—Liverpool T.C. Rewiring the electrical installation of St. John's Market. City Engineer and Surveyor, Municipal Buildings, Dale Street, Liverpool.

Oct. 5.—Stockport T.C. Supply of (a) 40 swan neck concrete lighting columns, and (b) 40 lanterns, chokes, condensers for 80 W H.P.M.V. installation. William F. Gardner, Borough Surveyor, Town Hall.

Oct. 8.—Belfast T.C. Supply and installation of electric heaters at Mountcollyer Street and Ariel Street maternity and child health centres, Belfast. City Surveyor's Department (Room 85), City Hall, Belfast.

Oct. 8.—Houghton-le-Spring (Durham) U.D.C. Supply and erection of reinforced concrete lighting columns and fittings in connection with replacement of gas with electric lighting on part of road A.182. Plans by W. H. Smith, Surveyor.

Oct. 8.—Leeds. Supply of electric lamps required by Transport Committee. Documents from A. B. Findlay, General Manager, 1 Swinegate, Leeds 1.

Oct. 8.—Northallerton R.D.C. Pumping plant. (*a*) Osmotherley; two electric motor and pumping sets each of 4,500 gal./hr.; (*b*) Jeater Houses: two sets each of 3,000 gal./hr., all with automatic control gear. Consulting Engineer, A. Brooksbank, 14 The Exchange, Bradford. Deposit £2 2s.

Oct. 8.—Plymouth. Electrical services in new secondary school at Newquay, and Falmouth Technical College. Applications by above date to Sydney Gregson, County Architect, Truro. Deposits, £5 5s. for Newquay, and £3 3s. for Falmouth.

Oct. 9.—Aberlour T.C. Electrical work in erection of 18 houses in Allardyce Cres. J. and W. Wittet, architects, 81 High St., Elgin.

Oct. 9.—Fraserburgh T.C. Conversion of electric street lighting, comprising 54 units, to sodium lamps. Also supply and erection of concrete lamp standards and sodium lamps along approximately 1½ miles of trunk road A92/A98. Separate contracts. G. S. Stewart is Borough Surveyor.

Oct. 12.—Belfast. Electrical installation in gymnasium and lecture rooms at Stranmillis Training College. Ministry of Finance, Room 103, Law Court Bldgs., May St.

Oct. 15.—Darlington R.D.C. Two electric motor and centrifugal pumping sets, one of 4,500 gal./hr. and one of 12,000 gal./hr. Apply to Consulting Engineer, A. Brooksbank, 14 The Exchange, Bradford. Deposit £2 2s.

Oct. 15.—Lancashire. Complete electrical installation in police houses erected in the county. About 100 such houses are built each year. Applications by above date to G. Noel-Hill, County Architect, County Hall, Preston.

Oct. 15.—Newton Abbot U.D.C. Electrical work in erection of 42 houses on Buckland estate, comprising Contract 19. Surveyor, 18 Devon Sq.

Oct. 15.—Sunderland T.C. Electrical installation in 802 houses on Hylton Red House and Pennywell estates. Borough Architect, Grange House, Stockton Rd. Deposit £2 2s.

Oct. 17.—Edinburgh. Installation of 230 V power wiring at Deanbank, Canaan Lane. City Architect's Office, City Chambers.

Oct. 17.—Leyton. Conversion of tower hoist at High Rd. baths from manual to electrical operation. Superintendent, Public Baths Dept., High Rd., E.10. (See Sept. 27 issue.)

Oct. 17.—Torquay T.C. Electrical installation for new Beach Dept's. store under public library. Applications to Borough Surveyor, Town Hall. Deposit 2 2s.

Oct. 20.—Sutherland. Electrical work in erection of additional accommodation at Dornoch Academy. County Architect is E. W. Brannen, Carnegie Bldgs., Dornoch.

Oct. 31.—Brighton T.C. Dismantling the existing passenger lift, and installing a new one at the Town Hall. Borough Engineer and Surveyor, 26-30 King's Road, Brighton.

Nov. 9.—Bingley U.D.C. Tenders invited for (*a*) supply, erection and installation of 18 concrete lighting columns, lanterns and auxiliary equipment in Mornington Rd., and (*b*) erection and conversion of gas lighting columns and supply, erection and installation of 17 swan-neck brackets, lanterns and auxiliary equipment in Chapel Lane and Dubb Lane. J. S. Lattin, Engineer and Surveyor, Town Hall. Deposit £2 2s. in respect of each scheme. (Advertised in this issue.)

Nov. 9.—Lincoln. Provision of electrical services in erection of Grantham Technical College. Applications to be submitted to County Architect, J. W. H. Barnes, County Offices, Sleaford, by Oct. 10.

No date stated.—North of Scotland H.E. Board. Supply, delivery and erection of 11 kV and lower voltage wood pole lines in the north-east of Aberdeenshire, Strichen area. Work divided into three contracts. Apply to Merz and McLellan, Consulting Engineers, 39 Northumberland Street, Edinburgh 3. Deposit £1 1s. for each contract. (See Sept. 20 issue.)

No date stated.—Oswaldtwistle U.D.C. Installation and erection of 50 400 W and 25 135 W h.p.m.v. columns and brackets for 1951-52 lighting scheme. T. D. Manning, engineer and surveyor, Town Hall, Oswaldtwistle. (See Sept. 20 issue.)

No date stated.—Auchterarder T.C. Electrical work in construction of 16 houses in Ruthven Street. Town Clerk is R. M. Young.

No date stated.—Roxburgh. Electrical works for Burnfoot primary school, Hawick. County Architect, County Offices, Newtown St. Boswells.

No date stated.—N. of Scotland H.-E. Board. Electrical installations at Errochty power station, Perthshire, covering lighting, heating and auxiliary cabling. Engineers are Merz and McLellan, 39 Northumberland St., Edinburgh 3. Deposit £2 2s. (See Sept. 27 issue.)

OVERSEAS

*Details of items marked * may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.*

Oct. 12.—Pakistan. Supply of two a.c. 400/230 V 3-phase 4-wire 50 c/s neutral earthed switchboards for Director-General, Dept. of Supply and Development, Frere Rd., Karachi. B.o.T. (Ref. CRE (IB) 71233/51).*

Oct. 17.—S. Africa. Capetown Electricity Dept. invites tenders for supply of vulcanised rubber insulated, lead sheathed, suitable for 660 V. Total of 8,000 yd required. City Electrical Engineer, Electricity House, Strand St. B.o.T. (Ref. CRE (IB) 71658/51).*

Oct. 24.—S. Africa. Supply of 5,000 fluorescent tubes 24 in. long, 20 W, daylight, for use on 110 V d.c. stock, and 1,000 starters for 110 V d.c., 20 W fluorescent lamps, for S.A. Railways.

Oct. 25.—Australia. Supply of 11 kV 250 MVA metal-clad switching equipment for Canterbury substation for Sydney C.C. Maintenance of plant for 12 months also included. C.C. is at Queen Victoria Bldgs., George St., Sydney. B.o.T. (Ref. CRE (IB) 71254/51).*

Oct. 30.—India. Director-General of Supplies and Disposals invites tenders for a 10 in. stroke puncher slotter with independent motor drive and push button control with electrical equipment for 400 V 3-phase a.c. supply, and an 8 in. slotting machine for motor drive complete with equipment motor and starter to suit 500 V d.c. B.o.T. (Ref. CRE (IB) 71167/51).*

Oct. 30.—New Zealand. Supply of 100 capacitors for Director-General (Stores Division), G.P.O., Wellington.

Nov. 6.—India. One cold saw-cutting machine with a.c. electrical equipment required by Director-General of Supplies and Disposals, Shahjahan Rd., New Delhi. B.o.T. (Ref. CRE (IB) 71205/51).*

Nov. 21.—Queensland. A number of small 22 kV distribution transformers, to Australian standard specification No. C61-1946, for State Electricity Commission. B.o.T. (Ref. CRE (IB) 70313/51).*

Nov. 23.—Brisbane. Tenders invited for supervisory control equipment for tramway sub-stations. Town Clerk, City Council, City Hall. B.o.T. (Ref. CRE (IB) 70956/51).*

Nov. 27.—New Zealand. Supply of 500 MVA 11 kV duplicate busbar indoor metal-clad draw-out type switchgear for Islington substation. State Hydro-Electric Dept., Wellington. Documents available at N.Z. Govt. Offices in London. Deposit £100.

Nov. 28.—India. One electro-magnetic crack detecting apparatus for testing of railway axles for Director-General of Supplies and Disposals. B.o.T. (Ref. CRE (IB) 71267/51).*

Dec. 14.—Brisbane. Manufacture and supply of one turbo-alternator set of 30 MW continuous rating, or two sets of this rating, complete with all accessories for City Council, City Hall. B.o.T. (Ref. CRE (IB) 70974/51).*

No date stated.—Ceylon. Tenders to be invited shortly for construction of Stage 11A of the H.-E. scheme at Watawala. Section C of this involves electrical and mechanical plant in extension to Laksapana station and 3 substations including three 12,500 kW alternators, 66 kV, 11 kV and 400 V a.c. switchgear with control gear and cables, 66 kV, 33 kV and 400 V switchgear and oil purifiers, transformers, arc suppression and decoupler coils, voltage boosters, lighting arresters, fire fighting equipment, etc. Section D includes 3 66 kV transmission lines of 18, 18 and 52 miles in length. Applications to Crown Agents for Colonies, 4 Millbank, S.W.1, by Oct. 31. (See Sept. 27 issue.)

No date stated.—Nigeria. Tenders invited for supply of electric cookers, kettles, water heaters (12 and 50 galls.), ceiling fans, table fans, and refrigerators. Details from E. C. Inston, Electricity Corp. of Nigeria, The Corner House, Gt. Peter St., S.W.1. (Advertised in this issue).

CONTRACTS PLACED

Colne T.C. Erection of 49 140 W sodium street lamps with concrete columns and all auxiliary equipment along A.50, General Electric Co.

Newcastle-on-Tyne. Electrical work at Bishop Auckland General Hospital, £1,495; same at Friarage Hospital, Northallerton, £1,685, N. of England Engineering and Electrical Co. Electrical work at Ryhope General Hospital, Reid Ferens and Co. Ltd., £4,571; same at Hemlington Hospital, Middlesbrough, A. Anderson and Sons, £3,784.

Newry.—Relighting town, using class A and B fluorescent lighting. Siemens Electric Lamps and Supplies Ltd. £16,000 approx.

Your Queries — Answered

"Tungar" battery chargers, makers of? L.C.—Edison Swan Electric Co., Ltd., 185 Charing Cross Road, W.C.2. (21529)

Ball and socket joints for flexible tubing, makers of? F.C.B.—Try Cotton and Preedy, Ltd., 44 Bishopsgate St., Birmingham; Crane, Ltd., 45 Leman St., E.1; and J. & E. Wildbore, Peter St., Oldham. (21537)

"Portograph" indicator sets, makers of? T.B.—Dictograph Telephones, Ltd., Aurelia Rd., Croydon, Surrey. (21546)

Stocks and dies with 3 triangles trade mark, makers of? S.E.—British Tap and Die Co., Town Rd., Tottenham, N.9. (21553)

"Unifire" fire bar, makers of? W.L.T.—Universal Equipment Co. (Northolt), Ltd., Green Lane, Hounslow, Middx. (21568)

"Joy-Scott" refrigerator, makers of? R.B.—Joy-Scott Refrigeration Co., Ltd., High Cross Rd., N.15. (21573)

"Lassolastic" tape, makers of? W.G.—Herts Pharmaceuticals, Ltd., Bessemer Rd., Welwyn Garden City. (21585)

FURTHER ANSWER

Lord's controller for lighting sets, makers of? F.D.—Lord's Controls, 77a High St., Camberley, Surrey state that they are the manufacturers of the equipment referred to last week. (21505)

The above are selected from questions we have answered this week. If you have a query, send it to us.

TRADE NOTES

New Branch Office. M.T.E. Control Gear Ltd. have opened a branch office at 47 Warwick Rd., Coventry (Tel.: Coventry 64561), for purpose of handling their control equipment in the Midlands area, Mr. J. A. Fishpool is branch manager for the area, which includes Gloucestershire and Cheshire.

Distribution. Porter Electrical Products Ltd. have appointed four wholesalers for distribution of their "Portaway" earthing system and "Fulgrip" bonding clamps. They are: Hirst, Ibbetson and Taylor Ltd., 47/55 Chapel St., Salford 3; The E.G.S. Co., Ltd., 10/12 Trafalgar St., Newcastle-on-Tyne; John Riley and Son (Sheffield) Ltd., 281/283 Attercliffe Rd., Sheffield 9, and Flinders (Wholesale) Ltd., 14/20 St. Peter's St., Ipswich.

Lead Price Down. As from Oct. 1, the price of imported good soft pig lead was reduced from £180 to £175 a ton, delivered.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Allen Electric Ltd., 2 Elmira St., S.E.13. Elec. engrs. and contractors, etc. Cap.: £10,000. Dirs.: L. A. Allen and Annie Allen.

Canadian Aviation Electronics (Overseas) Ltd. Cap.: £500. Dirs. to be apptd. by subs. Subs.: J. Cooper, 89 Kingsway, W.C.2; and S. H. Pl.ten, 49 Park Drive, Upminster, Essex.

Electronic and Television Services (Morecambe) Ltd., 51 Princes Cres., Bare, Morecambe and Heysham. Cap.: £1,000. Dirs.: W. E. Bamber, G. A. Ainsworth, E. Bradshaw, E. Meadows, and D. Baxter.

F. Middleton and Son Ltd., Coleridge Chambers, 177 Corporation St., Birmingham 4. Maintenance, constructional, mech., elec. and motor and genl. engrs., etc. Cap.: £4,000. Dirs.: J. T. Middleton (permt. mang. dir.), Lillian Middleton and Mabel Middleton.

A. J. Watkins (Camberley) Ltd., Doman Rd., Camberley, Surrey. Mnfrs. of and dealers in all kinds and p.rts of scientific engineering instruments and apparatus, mech. and elec. engrs., etc. Cap.: £100. Dirs.: A. J. Watkins and Mrs. E. M. Watkins.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	227 0 0	£220 0 0
LEAD, good soft pig (foreign)	175 0 0	136 0 0
" " " "English" quality	176 10 0	
Tin (99·99·75—) ... ...(Cash)	980-1000	—
" (3 months)	922½ 932½	—
ALUMINIUM, commercial purity (del.)	124 0 0	—
ZINC	190 0 0	140 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.)	55 5 0	—
Mild Steel Tape (0·04 in.)	32 5 0	—

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

B.T.H. in design. 682,223. Class 9. Electrical, electronic, phonographic and cinematographic apparatus and instruments. 682,224. Class 11. Installations and apparatus for lighting, heating and domestic cooking and refrigerating apparatus. British Thomson-Houston Co., Ltd., Crown House, Aldwych, W.C.2.

Diadem. 700,236. Class 9. Radio sets, radio gramophones, etc. J. S. Bush, 22 Shandor Court, Southgate, N.14.

Gallotone. 698,838. Class 9. Radio apparatus, amplifiers, etc. Gallo (Africa), Ltd., corner of Troye and Presidents Streets, Johannesburg.

Isotron. 699,457. Class 9. Static eliminators. Isotope Developments, Ltd., 120 Moorgate, E.C.2.

Lewmexbond, 692,008; **Lewenbond,** B692,009. Class 9. Insulated electric wire and fuse wire. London Electric Wire Co. and Smiths, Ltd., 24 Queen Anne's Gate, S.W.1.

Namrod. 698,039. Batteries. C. Dorman, Ltd., Plot 1061, Cranford Rd., Nairobi, Kenya Colony.

Philharmonic. 700,118. Class 9. Radio and television sets. A. Landau, 248-250 Bishopsgate, E.C.2.

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Marelli and Co. Ltd. Meeting of members to be held at 4 and 6 Throgmorton Ave., E.C.2, on Oct. 25, to receive liquidator's report.

Modern Electric Power Products Ltd. Petition for winding-up presented on Sept. 20 and directed to be heard before the Court at the Royal Courts of Justice, Strand, London, on Oct. 8.

S. Oliver and Son (Refrigeration) Ltd. Resolution for voluntary winding-up passed at meeting on Sept. 16. Alan W. S. Tabbenor, Kent House, Telegraph St., E.C.2, and Norman W. Osborne, 11-12 Finsbury Sq., E.C.2, have been appointed liquidators.

P. A. Robinson (Electrical) Co. Ltd. Resolution for voluntary winding-up passed at meeting on Sept. 11. Robert A. Rodgers, 25 Bedford Row, W.C.1.

Intended Dividend

London. Trustful Products Ltd., of 34a Sterne St., W.12, dealers in electrical equipment. Last day for receiving proofs, Oct. 14. Liquidator is Bernard Phillips, 76 New Cavendish St., W.1.

BANKRUPTCY ACTS

Application for Discharge

London. Royal Ernest Stebbings, trading as "Millman Refrigeration Service" at 87 Guilford St., W.C.1. Hearing to take place at Bankruptcy Buildings, Carey St., W.C.2, on Nov. 2, at 11 a.m.

Intended Dividends

Ashton-under-Lyne. Joseph A. Loftus, electrician, 7 Egerton St., Droylesden. Last day for receiving proofs, Oct. 9. Trustee is F. C. Ormrod, Official Receiver, 20 Byrom St., Manchester.

Wolverhampton. Joseph Hervey Bourne, trading as "The Amplified Illumination Co." at Rayleigh Works, Powlett St., Wolverhampton, and also in partnership with another as "E. Desborough and Sons" at same address. Last day for receiving proofs, Oct. 15. Trustee is Alfred Masefield Baker, 12 Waterloo Rd., Wolverhampton.

BUSINESS PROSPECTS

HOME

Aberdeenshire. Proposition for building a primary school at Aboyne has been submitted again. Estimated cost, £54,333.

Abingdon (Berks) R.D.C. Construction of 56 dwellings in groups of 18, 14 and 24 under separate contracts at Wootton. Architect, 60 Bath St.

Armthorpe. A police station, costing £22,000, is to be built in the district. Plans by West Riding County Architect's Dept.

Bebington T.C. Erection of 40 houses on Mill Park estate, Eastham. Borough Engineer and Surveyor, Brackenwood, Higher Bebington.

Brechin T.C. Tenders expected to be invited shortly for erection of 9 blocks of dwellings on Springfield site.

Bridlington T.C. Construction of three blocks of flats in Elma Ave. Borough Engineer and Surveyor, Town Hall.

Brixworth (Northants) R.D.C. Fifty-four houses to be built in district at a cost of £79,833.

Bury St. Edmunds T.C. Erection of 40 houses and 16 flats on Mildenhall Rd. estate. Borough Engineer and Surveyor, Borough Offices.

Canterbury. Erection of 22 houses on London Rd. site. L. Hugh Wilson, City Architect, Municipal Buildings.

Cardiff. Approval sought to amended plans for erection of a technical college at Western Ave., at estimated cost of £237,000.

Corby (Northants). Development Corp. is expected to invite tenders shortly for the first 500 houses and portions of town centre.

Corby (Northants) U.D.C. Council to apply for a loan of £103,146 to build 80 flats.

Dover. Plans approved for building a factory in Granville St. for London Fancy Box Co.

Durham. Construction of 20 houses at Framwellgate Moor. City Engineer, Town Hall. Forty houses to be built at Shincliffe.

Dungannon (Tyrone) R.D.C. Erection of 100 houses has been approved.

Ellesmere Port (Chesh.) U.D.C. Construction of nine blocks (32 in all) of bungalows. Council's Engineer and Surveyor is in Queen Street.

Evesham (Worcs.) R.D.C. Approval sought for construction of 50 houses, the majority of which will be at Church Honeybourne.

Falkirk. Dean of Guild Court has approved plans for extensions costing £19,000 to mills of British Aluminium Co. at David's Loan.

Gateshead T.C. Erection of 109 houses and flats on Wrekenton estate. H. J. Cook, Chief Architect, Municipal Buildings, Swinburne St.

Highworth (Wilts) R.D.C. It is proposed to build 35 houses at Stratton St. Margaret, 31 at Wroughton, 28 at Highworth, 10 at Hannington, 8 at Chiseldon and 4 at Blunsdon. Total is 116.

Inverness. Dean of Guild Court has approved plans for erection of warehouses and offices for a London firm (cost £17,000) as first big project to be carried out on industrial estate at the Longman.

Larne T.C. Site works to be started shortly on No. 5 housing scheme comprising 186 houses. Ogilby and McCutcheon, 5 Lombard St., Belfast.

Leeds. Erection of a hostel on Moorfield House estate. City Architect, Priestley House, Quarry Hill.

Lincoln. Erection of new school in Doncaster Rd., Scunthorpe. William Saunders and Partners, Quantity Surveyors, 14 Mercer Row, Louth.

Longbenton U.D.C. Plans prepared for erection of 16 houses at Ashleigh Grove, Benton. Surveyor is A. E. Sweetman.

Luton T.C. Erection of six blocks, each of 12 flats, on six estates. Borough Engineer, Town Hall.

Nairn T.C. A further 24 houses to be built on Millbank site.

Newcastle-on-Tyne. Council to apply for sanction to borrow £209,972 for erection of Rutherford grammar school and £155,393 for primary school accommodation at Denton Sq.

Newquay. County Council to build a secondary modern school in district. Tenders being invited. Sydney Gregson, County Architect, County Hall, Truro.

N. Ireland. Construction of 18 dwellings each at Whitehead and Castlerock. N.I. Housing Trust, 12 Hope St., Belfast.

North Riding. Erection of county primary school at Loftus. F. Barraclough, Education Offices, County Hall, Northallerton.

North Riding. £38,608 is to be spent on 20 police houses on various sites.

Nuneaton T.C. Scheme approved for erection of 24 houses at Gorsy Knob.

Orkney. British European Airways are to build a terminal building at Grimsetter airport at estimated cost of £15,000.

Penrith U.D.C. Holmeriggs Ave. is the site for proposed erection of 28 houses. Also the Brampton Public Utility Society is being asked to build 50 houses to accommodate workers employed by British Plasterboard Ltd.

Peterborough. Construction of 50 houses on Mountsteven Ave. estate. City Engineer's Office, Town Hall.

Petworth (Sussex) R.D.C. Thirty-two houses to be built on Wisborough Green site.

Rotherham. Sheffield Regional Hospital Board recommended to approve provision of new cables to supply electricity to Moorgate General Hospital. Estimated cost £1,120.

Southport T.C. Erection of 50 houses on Heathfield Rd. estate. Borough Architect and Town Planning Officer, Pavilion Buildings, Lord St.

South Shields. Borough Engineer, John Reid, has prepared plans for 48 houses on the Sunniside estate, Cleadon Park.

Sutton-in-Ashfield (Notts) U.D.C. One hundred houses to be built on Carsic Lane estate.

Twickenham T.C. Plans in hand for building a second block of 53 flats and maisonettes at Butts Farm.

OVERSEAS

U.S.A. Chrysler Motor Corp. would like quotations for 11,000 ft 7,500 V, 60 c/s, 3 conductor, 450,000 circular mill cable with varnished cambric insulation and lead jacket; and 6,000 ft, 15,000 V, 60 c/s 3 conductor, No. 0000 cable with same. Offers to J. E. Savery, Purchasing Agent, Chrysler Export Corporation, 341 Mass, Detroit.

MEETINGS TO NOTE

THURSDAY, OCT. 4

INCORP. PLANT ENGRS. (Peterborough Branch).—"Manufacture of Electric Lighting Fittings." Eastern Gas Board, Church St., 7.30 p.m.

I.E.S. (Leicester Centre).—"Lighting of the new House of Commons." E. Midlands Elect. Bd., Charles St., 6.30 p.m.

I.E.S. (Nottingham Centre).—Chairman's address by C. S. Caunt. E. Midlands Elect. Bd., Smithy Row, 5.30 p.m.

I.E.S. (Exeter Group).—"Stage Lighting." J. W. Strange. The Providence Hall, Northernhay St., 7 p.m.

A.S.E.E. (S. London Branch).—"Gyroscopes." W. J. Spencer. Cafe Royal, North End, Croydon, 8 p.m.

FRIDAY, OCT. 5

INCORP. PLANT ENGRS.—Scottish Conference at Dunblane opens. Continues to Oct. 7.

INST. OF X-RAY TECHNOLOGY.—"Transformer Oil." E. C. Montgomery. I.E.E., Savoy Place, W.C.2. 7 p.m.

ELECT. TRADES COMMERCIAL TRAVELLERS' ASSOC.—Ladies Night at Cafe Royal, London.

I.E.S. (Bath and Bristol Centre).—"Stage Lighting." J. W. Strange. S. W. Elect. Board, Colston Ave., Bristol, 5.30 p.m.

I.E.S. (Huddersfield Group).—"Lighting for High Speed Photography and Cinematography." J. Hadland. Elect. Showroom, Market St., 7.15 p.m.

MANCHESTER ASSOCIATION OF ENGINEERS.—Inaugural address by President, F. Buckingham, 'Engrs' Club, Albert Square, 6.30.

MONDAY, OCT. 8

PURCH. OFFICERS' ASSOC. (London).—"Commercial Relations between U.K. and Canada." Waldorf Hotel, 7.15 p.m.

I.E.E. (N.E. Centre).—Chairman's address by E. C. Rippon. Neville Hall, Westgate Rd., Newcastle, 6.15 p.m.

I.E.E. (S. Midland Centre).—Chairman's address by W. H. Brent. Grand Hotel, Birmingham, 6 p.m.

I.E.E. (Western Centre).—Chairman's address by J. W. Elliott. S. Wales Inst. of Engrs., Park Place, Cardiff, 6 p.m.

I.E.E. (Norwich). — "Electrical Methods of Measuring Mechanical Quantities." F. J. Woodcock. Royal Hotel, 7 p.m.

A.S.E.E. (Central London Branch).—"Television." G. W. Godfrey. St, Ermin's Hotel, Caxton St., S.W.1. 7 p.m.

A.S.E.E. (N.W. London Branch).—"Oil Switchgear Failures and Their Causes." N. Elliot. Prince of Wales Hotel, Kingsbury Rd., N.W.9, 7.45 p.m.

TUESDAY, OCT. 9

I.E.S. (London).—Presidential address by J. G. Holmes. Royal Instn., Albemarle St., 6 p.m.

I.E.S. (Liverpool Centre).—Chairman's address by D. St. C. Barrie. Merseyside & N. Wales Elec. Board, Whitechapel, 6 p.m.

INSTN. OF WORKS MANAGERS (Preston Branch).—"Responsibility of Management in Securing Increased Productivity." J. Ayres of Brush. Starkie House, Starkie St., 7 p.m.

I.E.E. (E. Midland Centre).—Chairman's address by A. W. Hirst. Loughborough College, 6.30 p.m.

I.E.E. (N. Midland Centre).—Chairman's address by E. C. Walton. Hotel Metropole, Leeds, 6.30 p.m.

I.E.E. (N.W. Utilisation Group).—"Modern Developments in Electric Welding." H. G. Taylor. Engrs. Club, Albert, Manchester, 6.15 p.m.

I.E.E. (N. Ireland Centre).—Chairman's address by S. McCracken. Presbyterian Hostel, Belfast, 6.45 p.m.

I.E.E. (Scottish Centre).—Chairman's address by Percy Butler, 39 Elmbank Crescent, Glasgow. 7 p.m.

A.S.E.E. (S.W. London Branch).—"High Frequency Heating." Capt. J. Wharton. St. George's Hall, St. George's Rd., Wimbledon, 8.15 p.m.

WEDNESDAY, OCT. 10

I.E.S. (Edinburgh Centre). — "Lighting for the Prevention of Industrial Accidents." E. W. Murray. 357 High St., 7 p.m.

INCORP. PLANT ENGRS. (E. Midlands Branch). — "Diesel - Electric Locomotive in Industry." F. D. Lester, of B.T.H. Welbeck Hotel, Nottingham, 7 p.m.

INSTN. OF HEATING AND VENTILATING ENGRS. (London).—"Work of the Fuel Research Station." A. Parker. Storey's Gate, S.W.1, 6 p.m.

I.E.E. (N. Lancs Sub-Centre).—Chairman's address by G. K. Alston. N.W. Elec. Board, North Rd., Lancaster, 7 p.m.

I.E.E. (N.E. Scotland Sub-Centre).—Chairman's address by J. I. Moir. Caledonian Hotel, Union Terrace, Aberdeen, 7.30 p.m.

I.E.E. (Southern Centre).—Discussion on "Electrical Measurement by Thermal Effects." Opened by L. G. A. Sims, Prof. J. Grieg and J. G. Freeman. R.A.E. College, Farnborough, 7.30 p.m.

I.E.E. (Oxford).—"Radar Principles and Application." Prof. A. Lee. S.E.B., 37 George St., 7 p.m.

A.S.E.E. (Bradford Branch).—Open debate: "Any Problems." Midland Hotel, 7.30 p.m.

A.S.E.E. (York Branch).—"Electric Water Heating." Philip Honey, Feasgate Restaurant, Feasgate, 7.30 p.m.

THURSDAY, OCT. 11

I.E.S. (Glasgow Centre).—"Lighting for Prevention of Industrial Accidents." E. W. Murray. 39 Elmbank Crescent, 6.30 p.m.

I.E.S. (Manchester Centre). — Annual luncheon. Also presidential address by J. G. Holmes. Town Hall Extension, 6 p.m.

INCORP. PLANT ENGRS. (Kent Branch).—"Thermal Insulation in Buildings." Queens Head, Maidstone, 7.30 p.m.

ELEC. POWER ENGRS. ASSOC. (Merseyside Tech. Group).—"Television." P. N. Vaughan-Jones and K. B. Pointin. Electricity Showroom, Whitechapel, Liverpool, 7 p.m.

I.E.E. (London).—Inaugural address by President, Sir John Hacking. Savoy Place, 5.30 p.m.

I.E.E. (N.E. Scotland Sub-Centre).—Chairman's address by J. I. Moir. Royal Hotel, Union St., Dundee, 7 p.m.

I.E.E. (W. Wales Sub-Centre).—Chairman's address by G. R. T. Edwards. Plaza Cinema, Swansea, 6 p.m.

FRIDAY, OCT. 12

I.E.S. (Birmingham Centre).—Chairman's address by R. A. Lovell. Imperial Hotel, Temple St., 6 p.m.

A.S.E.E. (Bristol Branch). — "Energy from the Atom." A. F. Possnett. Grand Hotel, 7.30 p.m.

A.S.E.E. (Nottingham Branch).—"Relays and Remote Control." Dr. Ing W. L. Stern. Electricity Showrooms, Smithy Row, 7.30 p.m.

E.I.B.A. (Gloucester Branch).—Annual Ball at Bell Hotel, Gloucester.

E.I.B.A. (N. Staffs Branch).—Buffet Dance at Ash Hall Hotel, Stoke-on-Trent.

E.I.B.A. (Birmingham Branch).—Annual Carnival Dance at G.E.C. Magnet Club, Witton.

MONDAY, OCT. 15

I.E.E. (London Students Section).—Chairman's address, "Keeping Electricity Safe," K. C. Pounds. Savoy Place, 7 p.m.

BIRMINGHAM ELECTRIC CLUB.—"Equipment of a Television Studio." F. C. McLean. Grand Hotel.

ELEC. POWER ENGRS. ASSOC.—"Simple Outline of Factors Influencing the Stable Operation of Electric Power System." A. H. Gray. Caxton Hall, S.W.1, 7 p.m.

PURCH. OFFICERS ASSOC. (E. London Branch).—"Study of Prices and Sources of Information." R. J. Mitchell. Valentine Hotel, Perth Rd., Ilford, 7 p.m.

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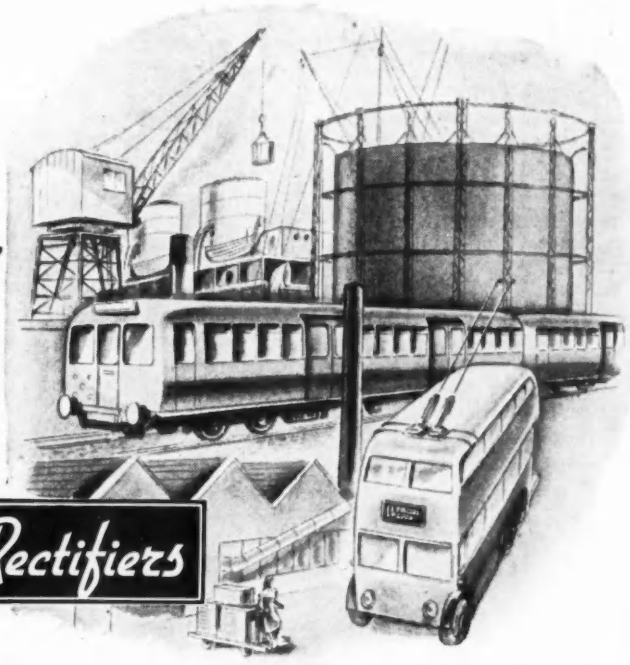

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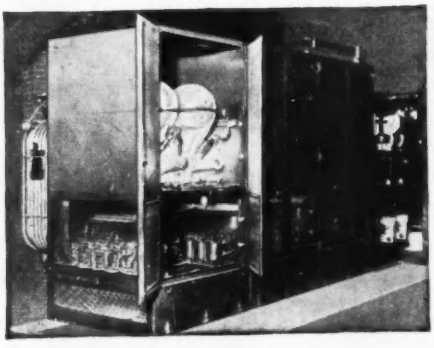
It is most efficiently and economically obtained from the usual a.c. supply system by using Hewittic rectifiers, the modern electronic converting equipment—static in operation, simple, supremely reliable, easily installed (due to unit construction) in less space than is required by obsolescent rotating plant, requiring negligible maintenance, operating UNATTENDED.



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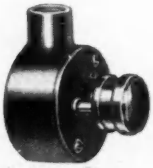

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CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. 0d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

CITY OF BELFAST

Electricity Department

SALE OF OFF-SERVICE D.C. ELECTRICITY MOTORS

TENDERS are invited for the purchase of off-service d.c. electricity meters.

Forms of tender may be obtained and the meters inspected at the Electricity Department, East Bridge Street, Belfast.

Each tender, in sealed envelope marked "Tender for Off-service D.C. Electricity Meters, Electricity Committee," and endorsed with the name and address of the tenderer, must reach the undersigned not later than 4 p.m. on Friday, October 26, 1951.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

The highest or any tender will not necessarily be accepted.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
September 28, 1951. (N 44)

THE ELECTRICITY CORPORATION OF NIGERIA

THE Electricity Corporation of Nigeria is prepared to accept tenders for the supply of ELECTRIC COOKERS (standard and "Baby" sizes), ELECTRIC KETTLES, WATER HEATERS (12 gallon and 50 gallon), CEILING FANS, TABLE FANS, and REFRIGERATORS (4 ft and 6 ft capacity).

Further details can be obtained from: E. C. Inston, Electricity Corporation of Nigeria, The Corner House, Great Peter Street, S.W.1. (N 29)

BINGLEY URBAN DISTRICT COUNCIL

STREET LIGHTING INSTALLATIONS

TENDERS are invited in connection with the following schemes:—

(*a*) MORNINGTON ROAD
The supply, erection and installation of 18 reinforced CONCRETE LIGHTING COLUMNS, lanterns and auxiliary equipment.

(*b*) CHAPEL LANE AND DUBB LANE
The erection and conversion of gas lighting columns, and supply, erection and installation of 17 SWAN-NECK BRACKETS, LANTERNS and AUXILIARY EQUIPMENT.

Drawings may be seen, and specification, bill of quantities and form of tender obtained from J. S. Lattin, Esq., M.I.Mun.E., A.M.T.P.I., Engineer and Surveyor, Town Hall, Bingley, upon payment of deposits of two guineas in respect of each scheme, which will be returned on receipt of a bona fide tender not subsequently withdrawn. Cheques to be made payable to Bingley Urban District Council.

Tenders, in sealed envelopes endorsed "Street Lighting—Mornington Road" and "Street Lighting—Chapel Lane and Dubb Lane" respectively, and not bearing any mark indicating the sender, must be received by the undersigned not later than noon on Friday, November 9, 1951.

The Council do not bind themselves to accept the lowest or any tender.

F. M. DUNWELL,
Clerk of the Council.

Town Hall, Bingley, Yorkshire. (N 60)

GOVERNMENT OF CEYLON

CEYLON HYDRO-ELECTRIC SCHEME,
STAGE IIA—25,000 kW

TENDERS. The Government of Ceylon will call for tenders shortly for the construction of Stage IIA of the Hydro-Electric Scheme at Watawala.

Under Stage IIA a seasonal storage reservoir will be provided by the construction of a mass concrete dam, 730 feet long, 130 feet high near Castlereagh about 5 miles upstream from the existing Norton Dam, so that the stored water can be released under control.

Two further pipelines about 5,444 feet long will be provided. Each pipe will be 48 inches diameter at the head diminishing in diameter to 36 inches at the terminal anchor blocks where the two 36 inch pipes will bifurcate into two to form three 33 inch pipes connecting to the turbine inlet valves.

The electrical and mechanical plant is to be erected in an extension to the existing Laksapana Power House near Watawala and in substations at Nuwara Eliya, Kurunegala and Colombo; they include three waterwheels for direct coupling to three 12,500 kW alternators which latter should also be supplied, self-closing valves; 66 kV, 11 kV and 400 V a.c. switchgear together with control gear and cables for power house; 66 kV, 33 kV and 400 V switchgear and oil purifiers for substations and the receiving station; transformers, arc suppression and de-coupler coils, voltage boosters, lightning arrestors, fire-fighting equipment, etc.

A 66 kV transmission line with steel towers and cadmium copper conductors about 18 miles long will be erected from Norton to Nuwara Eliya and another about 18 miles long from Peradeniya to Kurunegala and a third about 52 miles long from Laksapana to Colombo.

The work enumerated above will be carried out in four sections, namely:—

Section A—Mass Concrete Dam at Castlereagh.

Section B—Pipelines.

Section C—Electrical and Mechanical Plant.

Section D—Transmission Lines.

Separate tenders will be invited for each of the four sections. A Memorandum setting out further details of the work involved will be issued to prospective tenderers on application to the Crown Agents for the Colonies, 4 Millbank, London S.W.1. Firms which propose to tender for one or more sections of the work should apply to the Chief Engineer and Manager, Department of Government Electrical Undertakings, Ceylon, through the Crown Agents for the Colonies, 4 Millbank, London S.W.1, on or before October 31, 1951, setting out their experience, resources, etc. The capability of these firms to undertake the work will be examined by a Board constituted for the purpose and such firms as are considered satisfactory will be requested to tender. (M 214)

LANCASHIRE COUNTY COUNCIL

TO CONTRACTORS

THE Lancashire County Council propose to invite tenders for the complete ELECTRICAL INSTALLATION in police houses erected in Lancashire—approximately 100 houses are built each year.

In each case the work will be included as a provisional sum in a main contract, and the contractor whose tender is approved shall be a nominated sub-contractor to the various main contractors appointed by the county council within the meaning of the terms of the main contracts.

Contractors who desire to be considered for the above-named contracts should make application to Mr. G. Noel Hill, F.R.I.B.A., M.T.P.I., County Architect, County Hall, Preston, not later than 10.50 a.m. on October 15, 1951.

The county council do not bind themselves to approve the lowest or any tender.

R. ADCOCK,
Clerk of the County Council.

County Hall, Preston. (N 5)

APPOINTMENTS VACANT

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

AREA BOARD HEADQUARTERS
CHIEF ENGINEER'S DEPARTMENT
DISTRIBUTION DESIGN (SUBSTATIONS) SECTION
SECOND ASSISTANT ENGINEER
(Vacancy No. 127/51)

Duties will include the design of substations operating at voltages of 33 kV and above; preparation of schedules and specifications, and ordering of substation plant and equipment, including negotiations with manufacturers and inspection of equipment in course of manufacture; design of protective gear installations for the primary high-voltage systems.

Applicants should have had considerable experience of the above duties preferably in a large supply undertaking. Specialist knowledge of h.v. switchgear, large h.v. transformers or protective gear will be an advantage.

Applicants should possess a degree in electrical engineering and be Corporate Members of the Institution of Electrical Engineers.

Salary—N.J.B. Schedule C, Class "AX-DX," commencing salary £752 to £884 rising to £966 per annum.

DISTRIBUTION DESIGN (MAINS) SECTION
THIRD ASSISTANT ENGINEERS (CIVIL)
Two posts. (Vacancy No. 125/51)

To assist in the design and construction of high voltage substations and other civil engineering work.

Applicants should be Associate Members of the Institution of Civil Engineers and/or Associate Members of the Institution of Structural Engineers.

Candidates should have experience in design and detailing of reinforced concrete structures and foundations, and general civil engineering, also be able to prepare bills of quantities and specifications.

Salary—N.J.B. Class "AX-DX," Grade 5, commencing between £579 to £710 and rising to £776 per annum.

THIRD ASSISTANT ENGINEER
(QUANTITY SURVEYOR)
(Vacancy No. 125/51)

Applicants should preferably be Chartered Surveyors, have had experience in the preparation of bills of quantities, specifications, estimates, and the settlement of final accounts.

Salary—N.J.B. Class "AX-DX," Grade 5, commencing between £579 to £710 and rising to £776 per annum.

ENGINEERING DRAUGHTSMAN (CIVIL)
(Vacancy No. 125/51)

Applicants should have experience in preparing detail drawings of reinforced concrete work, structural steelwork and in general civil engineering.

Salary—N.J.B. Schedule D, Grade 6, £375 to £500 per annum.

Applications, stating the above vacancy numbers, and giving full details of age, qualifications, and experience, should be forwarded to the Secretary, Yorkshire Electricity Board, Wetherby Road, Scarcroft, Leeds, within 14 days of the appearance of this advertisement. (N 46)

LONDON ELECTRICITY BOARD

ENGINEERS (CONSTRUCTION)

APPLICATIONS are invited for the following appointments in the Construction Branch of the Chief Engineer's Department in Central London.

(a) Engineer (Construction) to supervise erection at various bulk supply sub-station sites within the Board's area, of heavy electrical plant, including transformers and switchgear, at working pressures of up to 66 kV, together with all auxiliary equipment. Applicants must have had previous experience of this work, both in the factory and in the field. Corporate membership of the Institution of Electrical Engineers and/or Institution of Mechanical Engineers would be an advantage.

(b) Engineer (Construction) to supervise the laying, jointing and testing of underground cables, within the Board's area, for working pressures up to 66 kV. Previous experience of such work and of the handling and checking of cable contracts is essential. Corporate membership of the Institution of Electrical Engineers will be of advantage.

The commencing salaries will be within the range of Class "AX," Grades 2 and 5 of Schedule C of the National Joint Board Agreement (February 17, 1950) and subsequently will vary in accordance with the classification of the Area, which is now "DX," subject to the provisions of the agreement. The inclusive ranges within Class "AX," are:—

Grade 2, £789 12s. to £928 4s. per annum.
Grade 5, £607 19s. to £754 10s. per annum.

Application forms, obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned completed within 10 days. Please enclose addressed foolscap envelope and quote Ref. EST/V/1331/T. on all correspondence. (N 41)

NORTH WESTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following posts:—

No. 1 Sub-Area

APPOINTMENT OF JUNIOR ENGINEERS—MAINS ENGINEER'S DEPARTMENT

Applicants should possess the Higher National Certificate in Electrical Engineering, or an equivalent qualification, and should have had a basic works training of not less than two years.

Successful candidates will be required to work in Manchester and surrounding districts, and will be given the opportunity to gain experience in various sections of the Mains Engineer's Department.

No. 1 Sub-Area

JUNIOR ENGINEERS (TESTING ASSISTANTS)

Applicants should have had experience of testing work associated with meters, instruments or protective equipment, and should be in possession of at least the Ordinary National Certificate and preferably the Higher National Certificate.

Experience in manufacturers' works will be considered an additional recommendation.

The salaries for the above posts will be in accordance with the National Joint Board Revised Agreement, and will be within the range of Class "M," Grades 21-17, i.e. £375/£481 per annum.

No. 1 Sub-Area

ASSISTANT DISTRICT MAINS RECORDER—NORTH WEST DISTRICT

Applicants must have had experience in mains surveying, plotting, sketching and revision of ordnance sheets, etc.

The salary for the post will be within the range of Grade 2 of the National Joint Council (Administrative and Clerical Grades) for the Electricity Supply Industry Salary Grades, i.e. £440 by £20 to £500 per annum.

No. 1 Sub-Area

SECOND ASSISTANT DISTRICT ENGINEER—WEST DISTRICT

The duties will include the supervision of the erection and maintenance of substation switchgear, laying and jointing of cables, and switching operations on the h.v. and l.v. systems within the district.

Applicants should have had a wide general experience on the distribution side of electricity supply. Corporate membership of the Institution of Electrical Engineers will be an advantage.

The salary will be in accordance with the National Joint Board Revised Agreement, Class "F," Grade 7, i.e. £625/£634/£643 per annum.

Applications for the above posts, stating age, education, qualifications and experience, present post and salary, should be received by the Sub-Area Secretary, No. 1 Sub-Area, The North Western Electricity Board, Town Hall Extension, Manchester, P.O. Box No. 493, not later than Saturday, October 13, 1951.

No. 3 Sub-Area

SECOND ASSISTANT ENGINEER (SITE TESTING)

The successful applicant will be stationed in the Testing Section of the Sub-Area Technical Engineer's Department located at Stalybridge.

The salary for the post will be in accordance with the National Joint Board Revised Schedule, Class "K", Grade 7, i.e. £786/£804/£822 per annum.

Candidates should have had extensive experience in the testing and maintenance of protective gear and in handling modifications to such equipment, the testing and maintenance of automatic tap changing and remote control equipment, high voltage testing of substation equipment and cables, and general field electrical testing work. Experience with ripple control equipment will be considered an additional recommendation. Corporate membership of the Institution of Electrical Engineers will be an advantage.

Applications, stating age and giving full details of training, experience, technical education and present post and salary, should be received by The Sub-Area Manager, No. 3 Sub-Area Headquarters, Union Street, Oldham, not later than Saturday, October 13, 1951. (N 31)

THE BRITISH IRON AND STEEL RESEARCH ASSOCIATION

ELECTRICAL ENGINEERS required by the above Association to carry out applied research in the iron and steel industry. Honours degree in electrical engineering essential. Experience in either heavy electrical engineering control problems and servo-mechanisms, or in electronics very desirable.

Age range 22 to 28. Starting salary according to age, qualifications and experience, up to £625 per annum. Post is superannuated under F.S.S.U. Location of work, London.

Written applications only, to Personnel Officer, B.I.S.R.A., 11 Park Lane, W.1. (N 59)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

SENIOR ASSISTANT TO THE CHIEF GENERATION ENGINEER (OPERATION)

APPLICATIONS are invited for the appointment of Senior Assistant to the Chief Generation Engineer (Operation) in the South Eastern Division based at Divisional Headquarters, Kingston-on-Thames.

The successful candidate will be required to take charge of a section responsible for co-ordinating the work of specialists both on the engineering and economic aspects of operation.

Good technical qualifications with a university degree are desirable, with a knowledge of all types of power station plant of modern type, although experience need not necessarily have been solely confined to power stations. Proved organising ability and leadership is essential.

The salary for the appointment, which is superannuable, will be approximately £1,400 p.a., dependent upon experience and ability, and will be provisional pending negotiations.

Applications, stating age, full details of general education, technical training and experience with relevant dates, qualifications, present position and salary should be forwarded to D. Moffat, Esq., Director of Establishments, British Electricity Authority, British Electricity House, Great Portland Street, London W.1, so as to be received not later than October 20, 1951. Please quote reference AE/208. (N 3)

LONDON ELECTRICITY BOARD

SENIOR DRAUGHTSMEN AND ENGINEERING DRAUGHTSMEN

APPLICATIONS are invited for the above positions based at the Southern Sub-Area Drawing Office, Beckenham, Kent, although the successful applicants may be required to work in any of the District drawing offices within the Sub-Area.

Candidates should have a good general and technical education and be experienced in one or more of the following subjects: Building and civil engineering design; engineering drawing; plant layout in substations; layouts and site plans of mains work, and electrical diagrams. Preference will be given to candidates who have made progress towards or who have obtained the Higher National Certificate in Engineering or its equivalent.

The posts are graded under Schedule "D" of the National Joint Board agreement as follows:

Senior Draughtsmen: Grade 5, £525 to £630 per annum.

Engineering Draughtsmen: Grade 6, £400 to £525 p.a.

(Salary figures are inclusive of London Area Allowance.) This grading is subject to approval of the District Joint Board and confirmation by National Joint Board.

Application forms obtainable from the Establishments Officer, 46 New Broad Street, London E.C.2, to be returned duly completed within 10 days. Please enclose addressed foolscap envelope and quote ref: V/1316/7/T on all correspondence. (M 205)

THE RAILWAY EXECUTIVE

VACANCY FOR ELECTRIFICATION ENGINEER, ELECTRICAL ENGINEERING NEW WORKS AND DEVELOPMENT ORGANISATION, R.E. HQ. (LOCATED AT KING'S CROSS)

THE Railway Executive invite applications for the position of Electrification Engineer, Electrical Engineering New Works and Development Organisation, R.E. HQ (located at King's Cross), the approximate commencing salary range for which is £1,100 to £1,200 per annum, according to qualifications. The successful candidate will be eligible for membership of a Superannuation Fund Scheme subject to the requirements of the rules.

Candidates should be trained engineers with experience of, and ability to supervise, preparation and carrying out of electric traction schemes, covering all aspects of electrical engineering work, i.e., power supply, contact system, rolling stock. Responsibilities include preparation of specification and handling of contracts.

Applications, giving full particulars of education, age and experience, should be sent within 14 days to the Secretary, Railway Executive, 222 Marylebone Road, N.W.1. Any approach except by direct and written application from candidates themselves will be a disqualification. (N 43)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

JUNIOR ENGINEER (Control) at Croydon 'B' Generating Station. Applicants should have had suitable training and experience in the operation of e.h.t. switchgear and the parallel running of alternators. Class "J", Grades 18/14, commencing at £400 per annum including London allowance.

Applications on forms obtainable from Divisional Secretary, British Electricity Authority, South Eastern Division, Lower Ham Road, Kingston-on-Thames, Surrey, to be received by October 17, 1951. (N 38)

CROWN AGENTS FOR THE COLONIES

SHIFT CHARGE ENGINEER required in connection with the Central Electrification Scheme in Cyprus, for two tours each of two years with prospect of permanency. Salary according to age and experience in the scale £720 rising to £840 a year. Free passages and quarters. Liberal leave with full salary. Candidates under 45 years, must have served an apprenticeship to mechanical engineering and have had considerable experience in the operation of a modern generating station. Preference will be given to candidates who are Corporate or Graduate Members of the Institution of Electrical Engineers and/or the Institution of Mechanical Engineers, or who hold equivalent qualifications.

Apply at once by letter, stating age, full names in block letters and full particulars of qualifications and experience, and mentioning this paper to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting M.28674.B. on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (N 7)

CROWN AGENTS FOR THE COLONIES

AREA SUPERINTENDENT required by the Government of Sierra Leone for the Electricity Branch of the Public Works Department for two tours of 18-24 months in the first instance. Commencing salary according to qualifications and experience in scale £774, rising to £1,060 a year including expatriation pay and temporary allowance. Gratuity of £25 for each completed period of three months, payable on satisfactory completion of service. Outfit allowance £60. Free passages. Liberal leave on full salary. Candidates must have served an appropriate apprenticeship and have had some years' practical experience in a responsible position on the erection, operation and maintenance of diesel engines in sizes ranging from 50 h.p. to 500 h.p. They must also have a good knowledge of the erection, operation and maintenance of three-phase four-wire 400/230 V overhead distribution systems, the running of alternators in parallel and similar matters connected with the operation of a public supply system. Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting M.28553.B. on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (N 1)

MIDLANDS ELECTRICITY BOARD

South Staffs. and North Worcs. Sub-Area

APPOINTMENT OF SECOND ASSISTANT ENGINEER (MAINTENANCE)

APPLICATIONS are invited for the above appointment at Sub-Area Headquarters, Toll End Road, Tipton, Staffs.

Applicants should have had experience in the commissioning, testing and maintenance of major plant and in maintenance of urban and rural networks including fault location. Preference will be given to candidates with appropriate technical qualifications.

Conditions of service will be in accordance with the National Joint Board Agreement for the Electricity Supply Industry, and the salary will be in accordance with Class "L", Grade 7, £841 per annum.

The successful applicant will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme if eligible.

Applications, stating age, education, qualifications, experience, present position and salary, should be forwarded within fourteen days to: Sub-Area Manager (Ref. C.W.), Midlands Electricity Board, Toll End Road, Tipton, Staffs.

A. STEPHENS,
Secretary.

September 25, 1951. (N 34)

SOUTH EAST SCOTLAND ELECTRICITY BOARD

CHIEF ENGINEER'S DEPARTMENT, AREA HEADQUARTERS

(Revised Advertisement)

FIRST ASSISTANT ENGINEER, Technical Section. Salary in accordance with N.J.B. Agreement, Schedule C, Class AX/BX, Grade 1, commencing at a point within the range £884 to £1,045, depending upon qualifications and experience. Appointment is superannuable. Candidates should have a sound general and technical education, preferably with University Degree, and Corporate Membership of the I.E.E. The post necessitates specialised experience in the design, installation and operation of protective gear as applied to urban and rural distribution systems. Duties will also include the carrying out of all relevant network calculations, and the preparation of reports and estimates.

Applications to the Chief Engineer, 52 Melville Street, Edinburgh, within 14 days. (N 4)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

(Vacancy No. 96/51)

APPLICATIONS are invited for the appointment of ENGINEERING DRAUGHTSMAN in the Generation (Operations) Department at Divisional Headquarters at a salary in accordance with Grade 6 of Schedule D of the National Joint Board Agreement (£375 to £500 per annum) according to capabilities and experience.

Applicants should preferably have obtained the Higher National Certificate or its equivalent and should be familiar with the layout of steam generating and condensing plant. The duties will include the preparation of preliminary layout drawings of plant modifications, etc.

The appointment is superannuable in accordance with the British Electricity Authority and Area Boards' Scheme.

Forms of application may be obtained from the Divisional Secretary at the address below to whom completed application should be returned not later than October 18, 1951.

H. V. PUGH,
Divisional Controller.

September 19, 1951.
The British Electricity Authority,
Cardiff (Pengam Moors) Airport,
Cardiff. (N 47)

BRITISH ELECTRICITY AUTHORITY

North Western Division

APPLICATIONS are invited for the following superannuable positions:—

POWER STATION SUPERINTENDENT
(Burnley) (Vacancy No. 569)

The salary range will be £857 to £875 per annum, in accordance with Grade 1, Class "C."

Candidates should have had a good technical education, and practical experience in the operation, maintenance and administration of a generating station. Corporate membership of the Institution of Mechanical Engineers and/or the Institution of Electrical Engineers, or equivalent qualification will be an advantage.

DEPUTY POWER STATION SUPERINTENDENT
(Stuart Street, Manchester) (Vacancy No. 570)

The salary range will be £948 to £994 per annum, in accordance with Grade 3, Class "H."

Candidates should have had a good technical education, and considerable practical experience in the operation and maintenance of a large generating station; experience with pulverised fuel-fired boilers will be an advantage.

Corporate membership of the Institution of Mechanical Engineers and/or the Institution of Electrical Engineers, or equivalent qualification will be an advantage.

JUNIOR ENGINEER
(Westwood Generating Station, Wigan) (Vacancy No. 571)

Salary range £375 to £428 per annum, Grades 16/14, Class "G."

JUNIOR ENGINEER
(Agecroft (L.P.) Generating Station, Pendlebury)
(Vacancy No. 572)

Salary range £375 to £406 per annum, Grades 15/14, Class "F."

JUNIOR ENGINEER
(Stuart Street Generating Station) (Vacancy No. 573)

Salary range £375 to £451 per annum, Grades 17/14, Class "H."

Applicants for Vacancy Nos. 571-2-3 should preferably possess technical qualifications, and experience in a generating station would be an advantage.

Applications, quoting vacancy number, stating age, qualifications, present position, and giving full details of education and experience, should be addressed to the Establishment Officer, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than October 20, 1951. (N 45)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the appointment of SECOND ASSISTANT ENGINEER, Protection and General Section of the Technical Department at Divisional Headquarters, Woolton, Liverpool. Salary £752 to £884 per annum, being Class "AX," Grade 2 of the National Joint Board Agreement.

Applicants should possess the Higher National Certificate in Electrical Engineering or equivalent qualifications and preferably have had experience with a manufacturer of high voltage power plant followed by extensive experience in the commissioning and maintenance tests associated with high voltage generating, transforming and transmission equipment.

Forms of application can be obtained from the Divisional Secretary, Clarke Gardens, Woolton, Liverpool, and should be returned not later than Monday, October 15, 1951.

A. R. COOPER,
Divisional Controller.
(N 49)

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the position of DEMONSTRATOR in the Wellington District.

Applicants should have had a good general education and the possession of a recognised diploma in Domestic Science and Electrical Housecraft will be an advantage.

Duties will include the conducting of lecture demonstrations both in the service centres and on consumers' premises, and advice to consumers on the selection and use of electrical apparatus.

Salary and conditions of service will be in accordance with the N.J.C., Grade 1, within the range of £360 to £400 per annum, with further progress to £440 per annum, subject to satisfactory service.

The successful applicant will be required to contribute to the Board's Superannuation Scheme, if eligible.

Training will be given where necessary to a suitable applicant.

Applications, in writing, stating age, education, etc., should be forwarded within 14 days to Sub-Area Manager, Midlands Electricity Board, Spring Gardens, Ditherington, Shrewsbury.

A. STEPHENS,
Secretary.
September 27, 1951. (N 50)

MIDLANDS ELECTRICITY BOARD

Central Gloucestershire Sub-Area

APPOINTMENT OF GENERAL ASSISTANT DISTRICT ENGINEER

APPLICATIONS are invited for the above position in the Stroud District of the Central Gloucestershire Sub-Area.

Applicants must have had experience in all branches of distribution work including operation and maintenance of high and low voltage cables and overhead lines, substations, etc. Appropriate technical qualifications will be considered an advantage.

Conditions of service will be in accordance with the National Joint Board Agreement, and the salary will be in Class "D", Grade 10, £465 per annum.

Applications in writing, giving age, and full particulars of experience and present salary and position, and quoting ref. GLOS/T/121, should be forwarded to: Mr. D. Holt, Manager, Central Gloucestershire Sub-Area, Midlands Electricity Board, 126 London Road, Gloucester.

A. STEPHENS,
Secretary.
September 25, 1951. (N 33)

NATIONAL COAL BOARD

North Western Division

APPLICATIONS are invited for an appointment as ASSISTANT to the Area Chief Electrical Engineer in the No. 2 (Wigan) Area, North-Western Division.

Salary will be dependent upon the age, qualifications and experience of the successful candidate, but not less than £600 per annum.

Applicants must have a thorough knowledge of electrical engineering in relation to collieries and workshops. Applications, which should include full particulars of age, qualifications and experience in chronological order and should be accompanied by copies of references, must be submitted to the Divisional Chief Electrical Engineer (Ref. AEE), National Coal Board, North-Western Division, 40 Portland Street, Manchester 1. The closing date for applications is October 13, 1951. (N 2)

EASTERN ELECTRICITY BOARD

Fens Sub-Area 107/51R

APPOINTMENT OF THIRD ASSISTANT ENGINEER (PLANNING AND DEVELOPMENT SECTION)

APPLICATIONS are invited for the appointment of a Third Assistant Engineer in the Planning and Development Section on the staff of the Sub-Area Engineer at Milton Hall, Milton, Cambridge.

Candidates should have had a sound technical training and experience in the design, layout and operation of urban and rural distribution systems at voltages up to 33 kV. Corporate membership of the Institution of Electrical Engineers or equivalent qualifications will be an advantage.

The salary for the appointment will be in accordance with Class "G," Grade 10, of the National Joint Board Salary Agreement, commencing at £539 per annum. Both future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a Superannuation Scheme and may be required to undergo a medical examination.

Applications, stating age, education, technical qualifications and experience, with details of present appointment and salary, should be submitted to the Manager, Fens Sub-Area, Eastern Electricity Board, Milton Hall, Milton, Cambridge, within 14 days of the appearance of this advertisement. (N 42)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

MAINTENANCE ENGINEER
HINCKLEY AND WARWICK

APPLICATIONS are invited from suitably qualified Mechanical Engineers for the position of Maintenance Engineer. Successful applicant will normally be stationed at the Warwick Generating Station (48 MW), but will have responsibilities at Hinckley Generating Station (6 MW).

Applicants should have had a sound engineering training and good practical experience of all mechanical repairs and maintenance.

Salary will be in accordance with Class "F", Grade 6 of the National Joint Board Schedule (£660-£692 p.a.). A house will be available for the successful applicant.

The post will be superannuable within the terms and conditions of the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, British Electricity House, Barker Gate, Nottingham and should be returned not later than October 15, 1951.

L. F. JEFFREY,
Divisional Controller.
(M 186)

FOREIGN OFFICE ADMINISTRATION OF AFRICAN COLONIES

APPLICATIONS are invited for a vacancy for an ELECTRICAL AND MECHANICAL ENGINEER in the Public Works Department under the Government of Cyrenaica. The appointment carries a salary of £700 by £25 to £825 per annum. In addition a foreign-service allowance ranging from £160 to £530 per annum according to individual circumstances is payable. Salary is not liable to U.K. Income-tax (Schedule E) and foreign-service allowance is free of tax. There is at present no local tax. Contracts (subject to medical examination) are for two years, renewable by mutual agreement. The climate of Cyrenaica is pleasant, healthy and suitable for British families. Benghazi, the capital, is only twelve hours' journey from the U.K. by air (single fare £30—return £50). Home leave is granted at the rate of 72 days for each two years of resident service; local leave at the rate of 18 days annually. Leave passages for officials and their families, as well as passages on first appointment and on termination of contract, are at Government expense. Candidates should be experienced in small Diesel power plant, h.t. and l.t. distribution system design and operation, and be capable of superintending operation of small water pumping installation. Responsibilities will embrace several small outstations. Candidates should have a University degree in electrical engineering or be graduate or associate member of I.E.E. Application forms from Ministry of Labour and National Service (K), Technical and Scientific Register, York House, Kingsway, London W.C.2, quoting reference No. D429/51-O-A. Closing date October 20, 1951. (N 6)

MIDLANDS ELECTRICITY BOARD

Shropshire and Herefordshire Sub-Area

APPOINTMENT OF GENERAL ASSISTANT DISTRICT COMMERCIAL ENGINEER

APPLICATIONS are invited for the above position in the Shrewsbury District of the Shropshire and Herefordshire Sub-Area.

Applicants should have had a sound technical training with practical experience in the sale and installation of domestic and commercial electrical equipment. The duties would also include dealing with consumers' inquiries, estimating, and supervising contract work. Appropriate technical qualifications will be considered an advantage.

The appointment will be in accordance with N.J.B. conditions and the salary will be Class "D," Grade 11, £436 per annum. The successful applicant will be required to contribute to the Board's Superannuation Scheme if eligible.

Applications, stating age, experience and present salary, should be forwarded within 14 days to: Mr. W. Winwood, Manager, Shropshire and Herefordshire Sub-Area, Midlands Electricity Board, Spring Gardens, Ditherington, Shrewsbury.

A. STEPHENS,
Secretary.
September 25, 1951. (N 32)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

ENFIELD CABLES LIMITED

need a SENIOR ASSISTANT in PUBLICITY Department, age 30-40 years. Electrical knowledge, able to produce own roughs and visuals for the technical press, catalogues and other literature.

Knowledge of modern packing design, window displays and exhibitions. Information to the Associate Director of Home Sales, Enfield Cables, Ltd., Victoria House, Southampton Row, W.C.1. (M 195p)

A FIRST-CLASS MAINTENANCE ELECTRICIAN required, essentially one used to a.c. and d.c. automatic control gear, and general maintenance of plant in large engineering works. Good pay and conditions, pension scheme.—Please write or call, Personnel Office, The Monotype Corporation Ltd., Salfords, Near Redhill, Surrey. (N 53)

A LARGE manufacturing firm in South West Lancashire has the following vacancies in its power line insulator department for JUNIOR ENGINEERS, aged 23-30, of Higher National Certificate standard in Electrical Engineering

(a) TECHNICAL ASSISTANT on production. Duties will include investigational work into production and development of the product, progress chasing and testing. Successful applicant may be given opening on manufacturing side later.

(b) INTERNAL TECHNICAL SALES ASSISTANT. Previous sales experience in the electrical industry and ability to handle correspondence essential.

Applications should be addressed to Box No. 1089; Electrical Times. (N 8)

A LARGE Electrical Engineering Company require a TRANSFORMER DESIGNER for work in a modern factory. Applicants should have experience of all types of distribution transformers. Excellent working conditions. Five-day week. Wide range of sports and social activities. Pension scheme in operation after qualifying period. There are facilities for housing in the case of successful candidates who are married.—Write, stating present occupation, age, and full particulars of experience, quoting Ref. GBE., to Box No. 1105, Electrical Times. (N 52)

APPLICATIONS are invited for vacancies in the Purchasing Dept. of a large electrical engineering manufacturer in the Midlands: (1) SENIOR EXECUTIVE BUYER with first class experience of bulk buying of all classes of relevant materials, particularly steel forgings and castings. Salary £600-£800 per annum. (2) TWO SENIOR EXECUTIVE ASSISTANTS for purchasing and internal administrative work in the department. Salary according to age and experience. Permanent positions, pension scheme. Successful applicants will have to find own accommodation, but for a limited period arrangement will be made in appropriate cases for special assistance.—Write, stating age, qualifications, experience and quoting Ref. ICE, to Box No. 1065, Electrical Times. (M 178)

BRITISH ELECTRICITY AUTHORITY (Merseyside and North Wales Division) invite application from suitably qualified persons for the appointment of WAYLEAVE ASSISTANT at Divisional Headquarters, Woolton. Experience in the electricity supply industry will be an advantage. The post is superannuable and subject to a medical examination. Salary within range N.J.C., Grade 2 £440 to £500 to N.J.C. Grade 3 £500 to £560, according to qualifications and experience.—Forms of application may be obtained from the Divisional Secretary, Clarke Gardens, Woolton, Liverpool. Closing date Friday, October 19, 1951. (N 48)

CABLE JOINTERS required, London area.—Malcolm and Allen (London), Ltd., 12 Henrietta Street, W.C.2. (N 65)

CHARGE ENGINEERS (operational) required at large industrial power plant. Applicants should have a thorough understanding of electrical power and process steam generation. Practical experience in electrical power distribution desirable but not essential. Commencing salary £900 per annum. Pension scheme. Age not less than 35 years.—Write, giving full particulars of experience and age to Box No. 1081, Electrical Times. (M 304)

CHIEF DRAUGHTSMAN for electricity meter manufacturer, N.W. London, with knowledge and experience of precision mass production, staff control, material specifications, D.O./Works procedure. Good salary and prospects, staff pension. Give details education, training, experience and salary required.—Box No. 1045, Electrical Times. (M 118)

DRAUGHTSMAN (senior) for old-established manufacturers of rotating electrical machines from 6 watts to 6 kW. Large variety of work. Waterloo (London) district. Permanent post.—Box No. 1109, Electrical Times. (N 63)

DRAUGHTSMAN required with some electrical experience for works in Worsley, Manchester.—Please write, stating age, experience and salary required, to Box No. 1079, Electrical Times. (M 301)

DRAUGHTSMEN. Vacancies exist on the permanent staff of Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, for Draughtsmen with at least ten years experience in the design of light and medium gears, fabricated structures and electro-mechanical equipment. Must be capable of working without supervision.—Apply in writing, stating age, experience, qualifications, salary required, etc., marking envelopes "Electronic Control," to Personnel Manager, Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester 17. (M 106)

ELECTRICAL DRAUGHTSMAN required as section leader, capable of planning power and lighting installations for workshops. Good technical training and experience essential, and knowledge of estimating an advantage. This is a progressive position and salary would be commensurate with ability. Staff pension scheme in operation.—Write, giving age, experience and qualifications, to Personnel Dept., Rubery Owen and Co. Ltd., Booth Street, Darlaston. (N 22)

ELECTRICAL DRAUGHTSMAN with H.N.C. required, with experience of industrial plant, electrical layouts, diagrams and specifications. Salary in accordance with ability and experience. Staff profit sharing scheme and pension fund.—Apply, stating age and full particulars of experience, to: The Chief Engineer, The Associated Portland Cement Manufacturers Ltd., Portland House, Tothill Street, Westminster, London, S.W.1. (N 18)

ELECTRICIAN wanted who is prepared for a hard drive now, to build for a lucrative future. Must have good credentials, thorough knowledge of trade, able to estimate and to organise his staff. City firm.—Write, stating age, etc., and salary required, Box 7864, Frost-Smith Advg., 64 Finsbury Pavement, London, E.C.2. (N 12)

ENGINEER required, London area, accustomed to estimating and/or supervising large cabling contracts. Also one ASSISTANT ESTIMATOR and one DRAUGHTSMAN for detailing cable routes and supports.—Box No. 1111, Electrical Times. (N 64)

FIRST-CLASS INSTRUMENT MAKER with knowledge of mechanical and electrical clocks and mechanisms, required for clock experimental department. Good starting salary plus profit sharing. Canteen facilities. Apply: Personnel Manager, S. Smith & Sons (England) Ltd., Waterloo Road, N.W.2. (M 229)

FOREMEN LINESMEN for wood pole construction with experience in h.v. rural and l.v. distribution for work in Scottish areas: Ayrshire, Renfrewshire, Dumbartonshire and others. Good rates to suitable men.—Apply, with full details, to James Kilpatrick and Son, Ltd., Kelvin House, River Cart Walk, Paisley. (N 51)

JOHNSON AND PHILLIPS LTD., have vacancies in their transformer department for an experienced TRANSFORMER DESIGNER capable of dealing with all sizes up to 10 MVA; EXPERIENCED DRAUGHTSMEN capable of handling all medium sizes up to 2,000 kVA alternatively 5,000 kVA.—Applications, giving age, experience, training and salary expected, should be addressed to Employment and Welfare Manager, Johnson and Phillips, Limited, Victoria Works, Charlton, London, S.E.7. (N 9)

JOURNEYMAN PLUMBER JOINTERS required immediately. London rate of pay and out allowance.—Write, stating age and experience to Box No. 1091, Electrical Times. (N 10)

JUNIOR DRAUGHTSMAN required, aged 21 to 25 years, preferably some experience overhead line switchgear. —Line Equipment Ltd., Bridgend. (N 11)

MANUFACTURERS of Rotating Electrical machines urgently require ELECTRICAL TESTER with some technical training for machines up to 6 kW. Large variety of designs. Good rate offered with bonus. Canteen.—W. Mackie and Co. Ltd., 129 Lambeth Road, London S.E.1 (near Lambeth Bridge). (N 17)

OPENINGS for two ELECTRICAL DRAUGHTSMEN between 40 and 50 years of age, West Midlands. Preferably experienced cranes and heavy steelworks plants, layouts and diagrams. Compulsory pension scheme, good canteen facilities, five-day week with some overtime. State age, present salary and give references.—Reply to: Chief Electrical Engineer, The Wellman, Smith, Owen Engineering Corporation Ltd., Darlaston, South Staffs. (M 165)

RADIO ELECTRICIANS and ELECTRICAL FITTERS. Vacancies exist in the Dockyard Radio Centre, Admiralty Storage Depot, Risley, near Warrington, for trained radio and electrical craftsmen. Starting rate (44-hour five-day week) 129s. In addition a bonus of up to 8s. weekly is payable based on assessment of merit during first three months of service. Possibility of future advancement to 153s. weekly. Overtime rates for Saturday attendance. Assisted travel scheme in operation. Hostel accommodation available at 35s. weekly. Canteen meals provided at reasonable prices.

Apply to your local office of the Ministry of Labour for further particulars. (M 4)

REFRIGERATION SALES SUPERVISORS

VACANCIES occur in the Prestcold Manchester organisation for experienced sales supervisors. Successful applicants must have a sound selling record with one of the leading makes of refrigeration equipment, and will operate extensive territories in

MANCHESTER/CHESHIRE
AND
BOLTON, BURNLEY, BLACKBURN
AREAS

Able to control sales staff. Salary, commission and expenses will be paid to the candidates selected for permanent appointment. Staff pension facilities available. Write in confidence to the

Branch Manager,
PRESSED STEEL CO., LTD.
44 Canal Street, Manchester 1

(N 39p)

PROFESSIONAL ENGINEERS IN GOVERNMENT DEPARTMENTS. The Civil Service Commissioners announce an Open Competition to be held during 1951 for permanent appointments in many departments of the Civil Service for a wide variety of engineering duties. Applications will be accepted at any time but not later than December 31, 1951, and selected candidates will be interviewed as soon as possible after the receipt of their application forms. Candidates are advised to apply as early as possible.

Age limits: Candidates must be under 35 on November 30, 1951, with extension for regular service in H.M. Forces and for established Civil Service. For appointments in the Post Office they must be 21 or over, in the Ministry of Supply, 23, and in all other departments 25 or over on that date.

Minimum Qualifications vary for different posts. Generally a university degree in engineering or corporate membership of the Institutions of Mechanical Engineers, Electrical Engineers or Civil Engineers, or passes in or exemption from Sections A and B of the corresponding associate membership examinations, or evidence of exceptionally high professional attainment are required. For certain posts, corporate membership of the Institute of Fuel by examination or the Institution of Chemical Engineers, or graduate membership of the Institution of Chemical Engineers, or associate fellowship of the Royal Aeronautical Society or an honours degree in physics will be accepted instead.

The salary on appointment will be fixed according to age. The salary for men aged 25 in London is £575 rising by annual increments of £25 to £750, and by £30 to £900. Salaries for women and for posts outside London are lower. There are prospects of promotion to higher grades on scales for men in London of £900-£1,200, £1,250-£1,450 and above.

Further particulars and application forms from Secretary, Civil Service Commission, Trinidad House, Old Burlington Street, London W.1, quoting No. S85/51. (N 16)

RADIO MECHANICS required for work on centimetre equipments at Stanmore. Previous experience essential. Progressive staff positions; 5-day week.—Write, giving full details of age, experience and qualifications, to the Staff Manager (Ref. GBLC/G/45), Research Laboratories of the General Electric Company Limited, North Wembley, Middx. (M 300)

REPRESENTATIVES required by London Electrical Wholesalers for the following areas: S.E. London, N.W. London, and the City.—Apply in detail to Halsey's Electric Co., Ltd., 10 Lower Grosvenor Place, S.W.1. (N 30)

SALES ENGINEER required for estimating staff o industrial and traction resistance manufacturer. Experience motor control gear design desirable. State age, experience and salary required.—Box No. 1093, Electrical Times. (N 13)

SKILLED ELECTRICIANS wanted with overhead electric crane and steelworks machinery experience, willing to travel U.K.—Apply: Personnel Officer, The Wellman Smith Owen Engineering Corporation Ltd., Darlaston, South Staffs. (N 15)

APPOINTMENTS FILLED

UGANDA ELECTRICITY BOARD

ACCOUNTANCY ASSISTANTS

APPLICANTS for the above appointment are thanked for their applications and are informed that the Board's immediate requirements have been met. Further vacancies will occur in due course and applicants are advised that when the need arises a further selection for interview will be made from the numerous applications already received.

C. R. WESTLAKE,
Chairman.

P.O. Box 559, Kampala.
September 25, 1951. (N 19)

APPOINTMENTS WANTED

ELECTRICIAN-WIREMAN (38), 19 years' experience of all installation systems, repairs, etc., requires situation in Guernsey, C.I., or Southern England. Free now.—Box No. 1095, Electrical Times. (N 14)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed. Edgware 8631 (4 lines).—Service Electric Co., Ltd., Stanmore, Middx. (D 324)

CASTINGS, Fisher Foundries, Ltd., Great, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham. Victoria 0197. (L 318)

METALWORK. All types cabinets, chassis, racks, etc., to your own specifications.—Philpott's Metalworks Ltd., Chapman Street, Loughborough. (L 601)

WANTED

A.C./D.C. MOTORS, STARTERS, complete change-over installation, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Tel.: Chiswick 5105. (A 20)

BEST prices and a square deal offered in cash for ALUMINIUM, BRASS AND COPPER in sheets or rods. Works clearances and scrap a speciality.—Dyas and Fowle, 41 Loudoun Road, London N.W.8. Maida Vale 5477, 8641 and 5489. (N 61)

ELECTRICAL STEEL OFFCUTS required. Small and large quantities from between ·016 in. to ·025 in. in 2 ft lengths or upwards but not less than 3 in. in width. Prompt payments.—Box No. 1063, Electrical Times. (M 167)

URGENTLY required, 16 s.w.g. ENAMELLED COPPER WIRE, also other gauges, state quantity and prices to Armature Service Co., Ltd., Cinema Buildings, Haddington Street, Hove. (N 54)

WANTED, ROTARY CONVERTORS, any size.—Universal, 221 City Road, London E.C.1. (A 16)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady Street, Bethnal Green, E.1. (A 1)

WANTED, Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube Boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling. —Apply, giving full details to Midland Iron and Hardware Co., Cradley Heath. (A 5)

WANTED. D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co., Ltd., 22-26 Britannia Walk, London N.1. (A 13)

AGENCIES

MANUFACTURERS' agents having wonderful connection with electrical wholesalers throughout the country are seeking additional representations, preferably small firms.—Please send details of products in confidence, Box No. 1107, Electrical Times. (N 58)

NEW ZEALAND ELECTRICAL IMPORTER

of ELECTRICAL EQUIPMENT and APPLIANCES

DESIRES SOLE AGENCIES

Interested manufacturers are invited to communicate with

"AGENCY,"
P.O. Box 475, Palmerston North,
NEW ZEALAND

We can assure efficient sales organisation and complete N.Z. distribution.

(M 302p)

FOR SALE

CABLES & WIRE

EARTH-CONTINUITY: Use Portaway Earthing Conductor with the Fulgrip-Portaway bonding clamp for most efficient earthing system.—Details from Porter Electrical Products Ltd., Bramhope, Leeds. Tel. 73428. (N 40)

ENAMEL COVERED COPPER WIRE, new bulk supplies for early delivery, 35 to 14 s.w.g.; prices 13/6 to 9/- lb. —J. A. Brooke and Co., Longridge, Fyrford, Surrey. (N 57)

NEW CABLE, ex stock, 100 yd coils. 40,000 yd, 3/036, SINGLE H.S.O.S., £20 per 1,000 yd; 15,000 yd 7/029, TWIN BRAIDED V.I.R., £40 per 1,000 yd; 20,000 yd 28/012, TWIN TWISTED FLAX, £30 per 1,000 yd.—Crowlas Trading Co., Ltd., 11 Soho Sq., London W.1. Phone: GERrard 5731. (N 55)

TINNED STEEL ARMATURE BINDING WIRE. All sizes from 14 s.w.g. to 30 s.w.g. supplied in coil or on reels—Frederick Smith and Co., Wire Manufacturers Ltd., Caledonia Works, Halifax. (N 20)

DOMESTIC APPLIANCES

IMMERSION HEATERS, Grubb 4 kW. No purchase tax. All lengths, 16 in. to 36 in. Standard voltages. Provision for intermediate loadings. Fully guaranteed. Write for illustrated brochure, latest lists and traders terms to distributors.—John Owner and Co. Ltd., Springfield Road, Birmingham 13. Tel.: Spr. 2939. (C 392)

"MORAHEAT" 4 kW IMMERSION HEATERS with Satchwell thermostatic control, 16 in. to 42 in. Fully guaranteed, reliable, competitive, good deliveries. —Apply: Agent, W. Tyler, 20 Finnemore Road, Little Bromwich, Birmingham. (M 166)

ENGINEERING PLANT & MATERIALS

ALUMINIUM and ALLOY SHEETS in various sizes available in most gauges. Copper, brass and aluminium in strip, rods and tubes.—Send for list or call Dyas and Fowle, 41 Loudoun Road, London N.W.8. Maida Vale 5477, 8641 and 5489. (N 62)

COPPER. Flat and round bars. Surplus to our requirements.—Details, Wandleside Cable Works, Limited, 106 Garratt Lane, S.W.18. (N 24)

HIGH CYCLE DRILLS, No. 14 D.H., ¼-h.p., 220 V; 160 for sale.—Foundation Oil Co., Ltd., 8 Orford Hill, Norwich. (N 25)

STEEL sheets or off-cuts, any shape, size and gauge, or stock rusty, any quantity or distance.—W. Marriott, 10 Hockley Hill, Birmingham. (N 56)

GENERATING PLANT

ONE 55 kW 3-phase 50 cycles 400/440 V McLaren-Brush self-contained DIESEL ALTERNATOR (235/250 V single phase).—Box No. 1099, Electrical Times. (N 35)

TURBO-GENERATORS (2 sets). Surplus for disposal. Two 1,000 h.p. turbo sets by Metropolitan Vickers (certified condition). 4,000 lbs. per hour by-pass at 10 lbs. Helical gearbox 7,500/1,000. Surface condenser. Circular water pump and piping. Complete to 600 kW, d.c. generator 2,000 amps. 50 kW alternator, 4,000 V 50 periods, and exciter, on an extended shaft.—Enquiries to The Ocean Chemical Co. Ltd., 29 Dumont Road, London, N.16. (N 23)

TWO 65 kW MOTOR GENERATING SETS mounted on steel bedplate comprising : Brooks 110 h.p., 960 r.p.m., slip ring, 400/3/50 B.B. a.c. Motor Direct coupled to Generator 65 kW., Volts 0/650 d.c. with Exciter 1·5 kW, 210 V, complete with liquid Starters and Panel.—Apply: C. J. Rice, 137 Mayplace Road West, Bexleyheath, Kent. Tel.: Bexleyheath 3282. (L 539)

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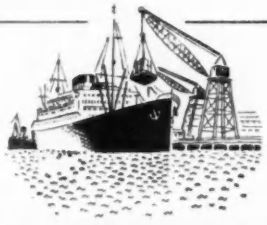

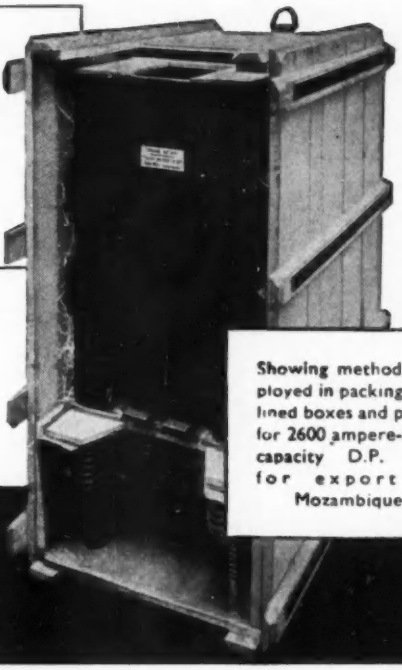

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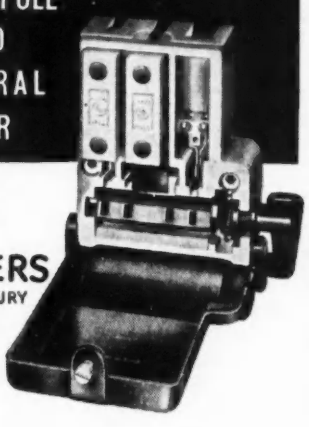

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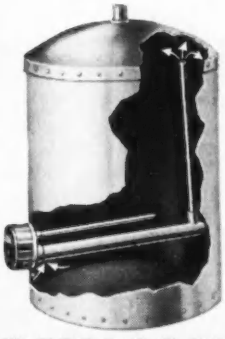

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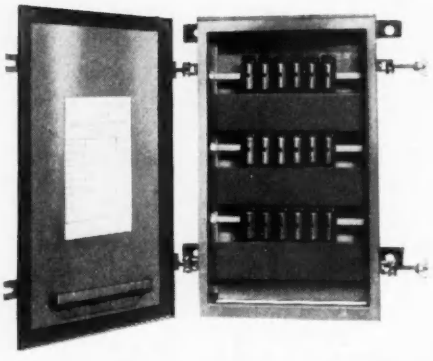

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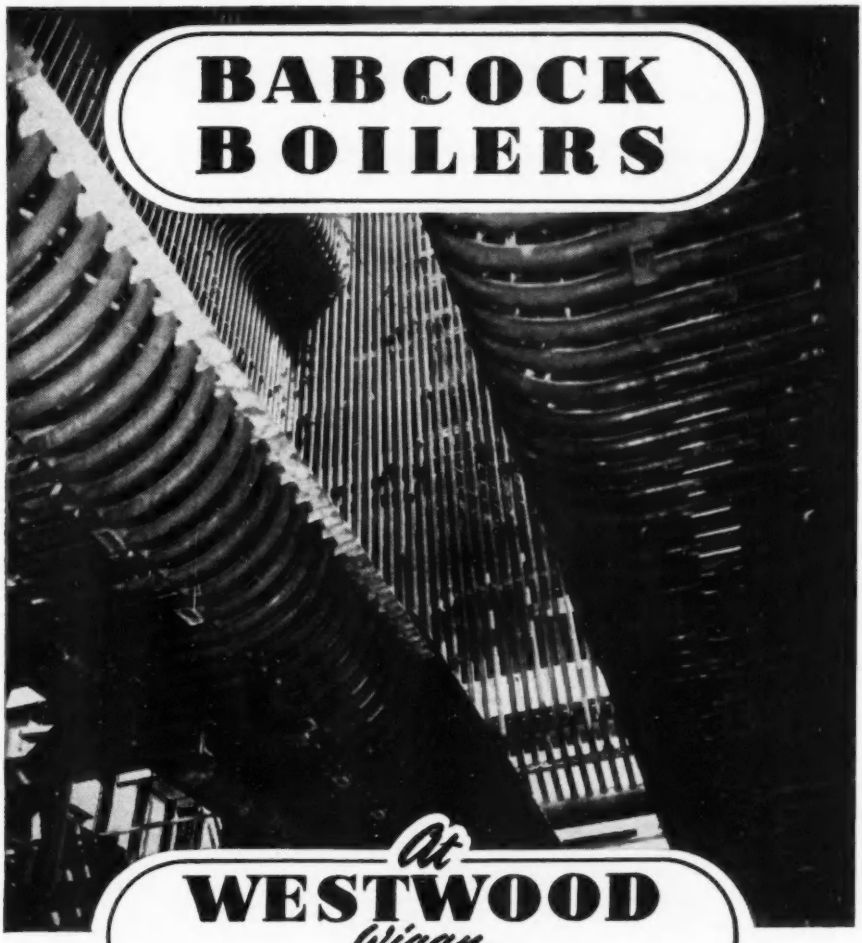

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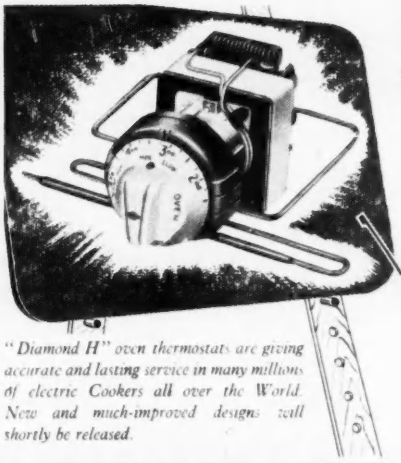

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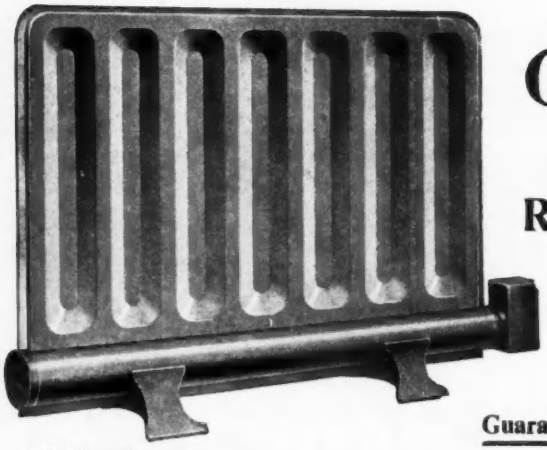

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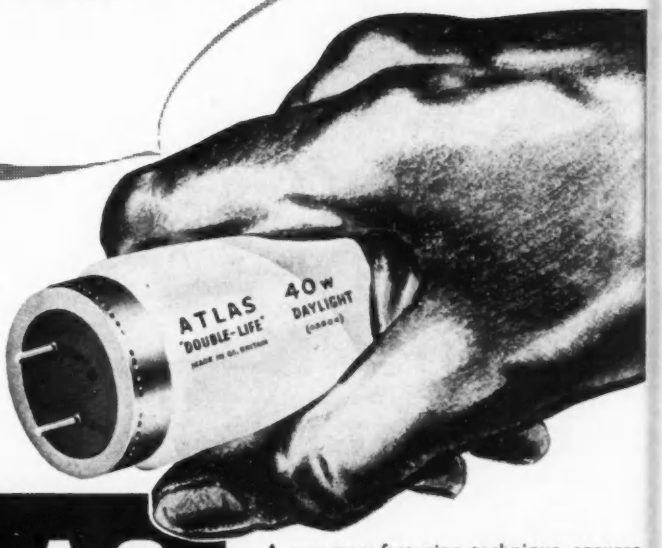

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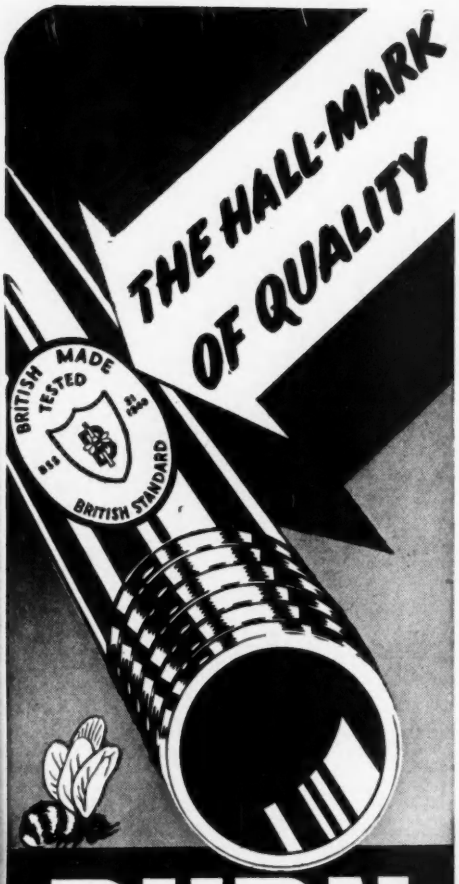

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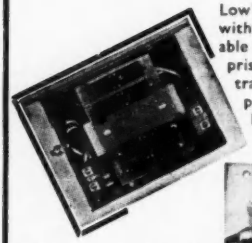

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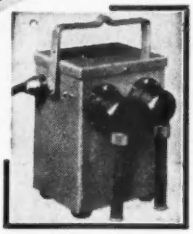

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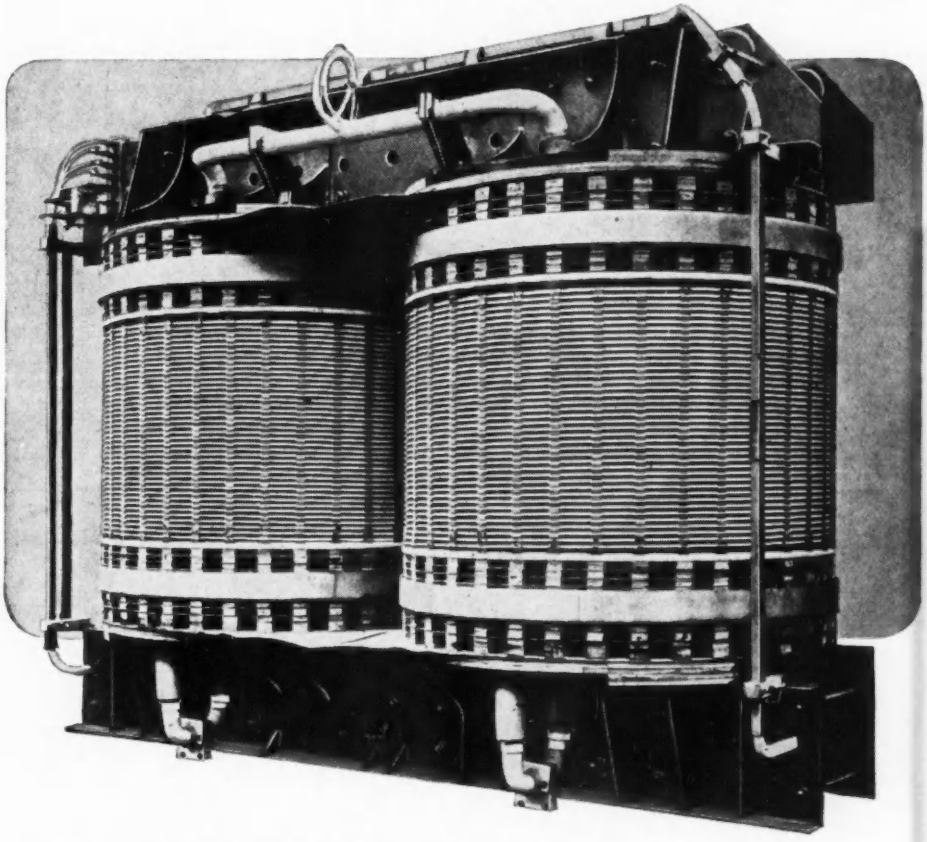

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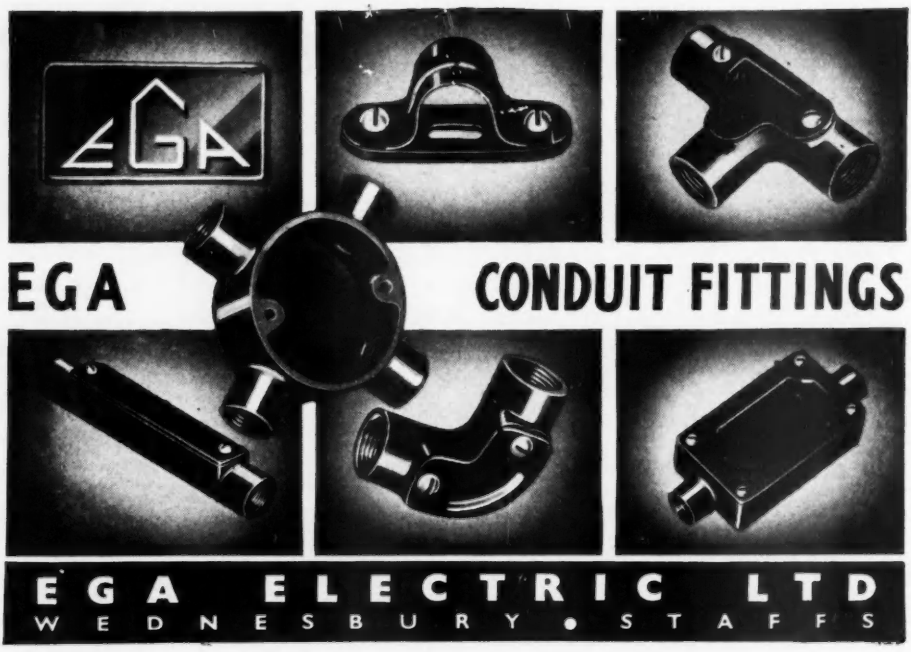

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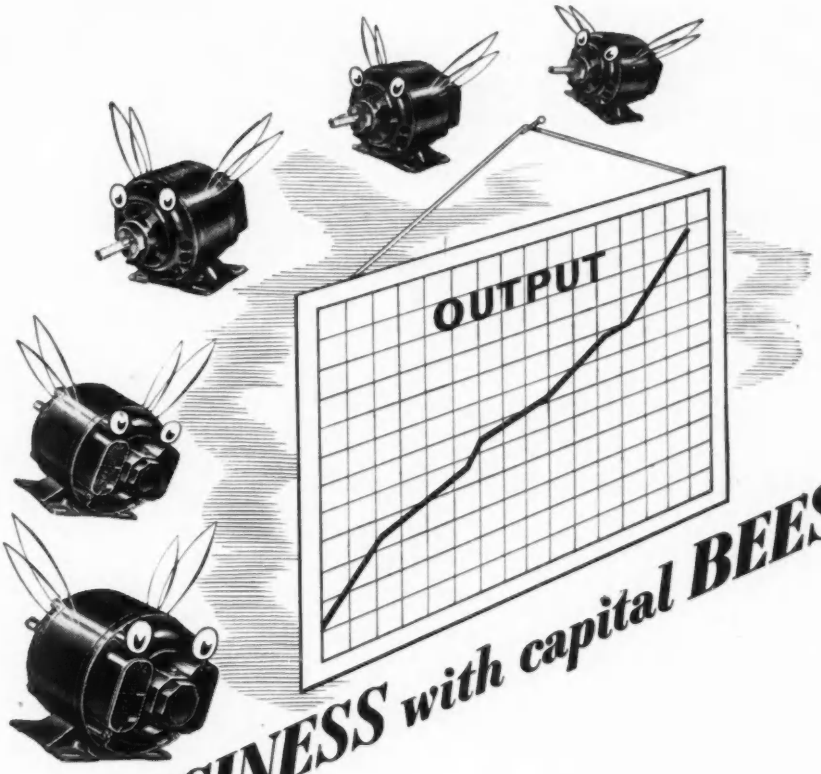

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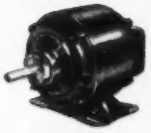

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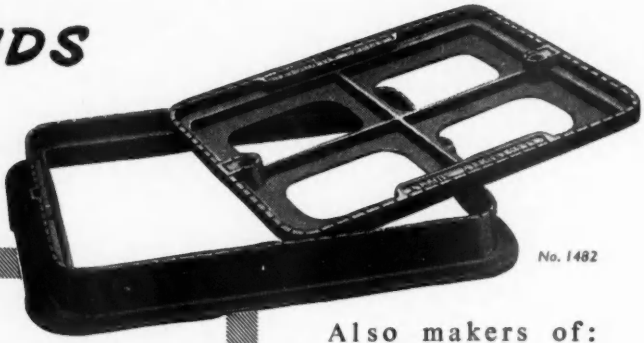

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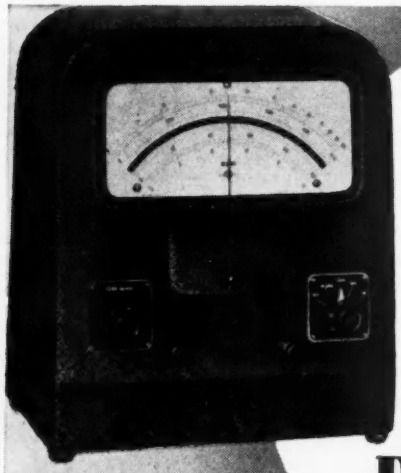

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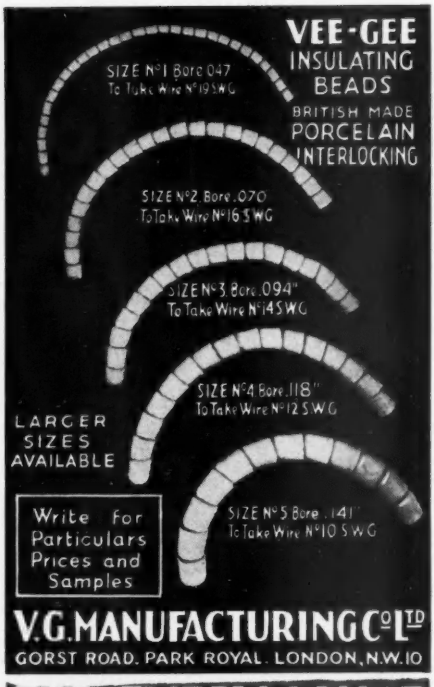
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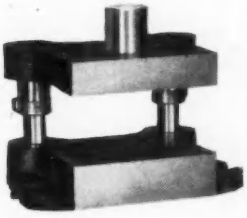

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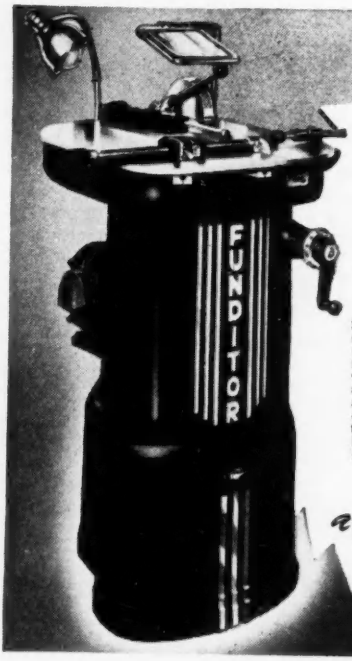

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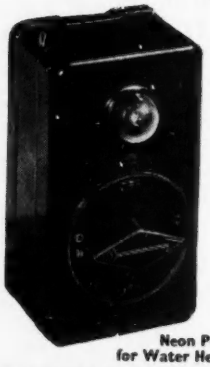

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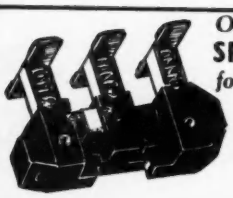

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The control gear for this motor and the rectifier which supplies it are of E.C.C. make.

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Telephone 21455 (7 lines)

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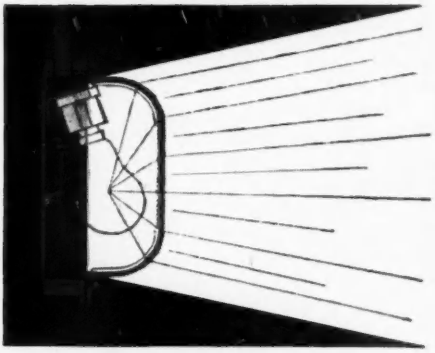

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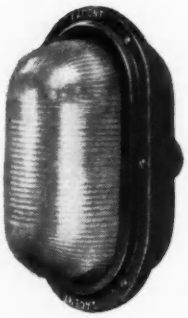

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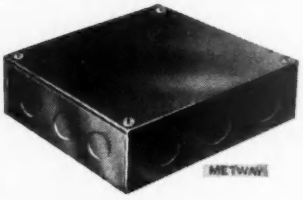

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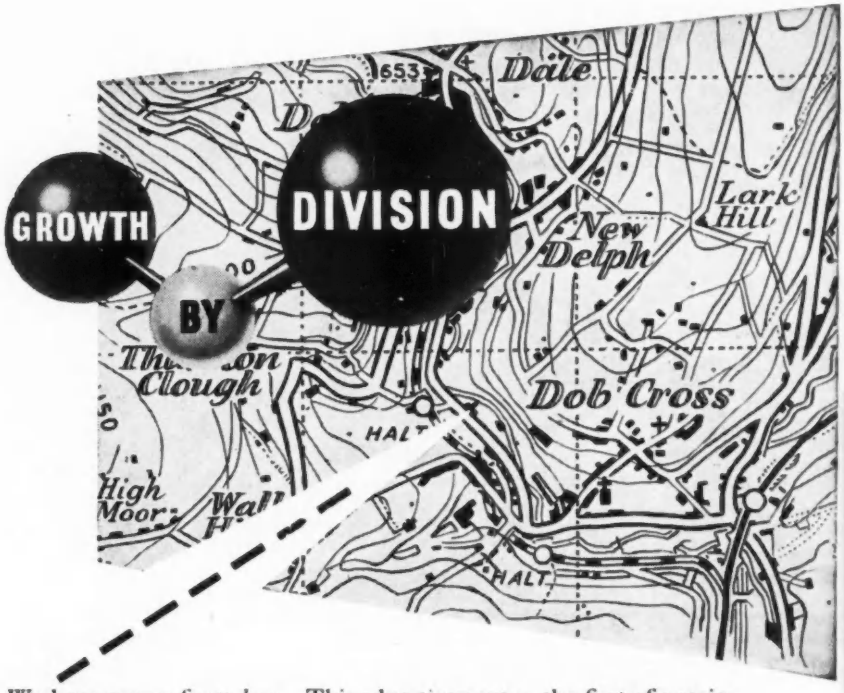

We have grown from *here*. This advertisement is the first of a series which will tell you about our Company and our products. Ours is the story of growth by division, a pattern we planned years ago, believing that in a highly technical industry small specialised manufacturing units can be more efficient and give better service than large ones.

We are *one* company operating in three different fields. Each division is a business on its own, for each has a separate factory, technical staff and commercial organisation. Perhaps you, like many others of our friends, only know one division of our business . . . in these advertisements you will be introduced to them all.

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GAS CONVERSION

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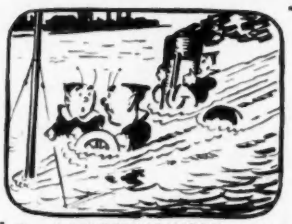

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"We'll never make harbour tonight,
Unless," said OH,
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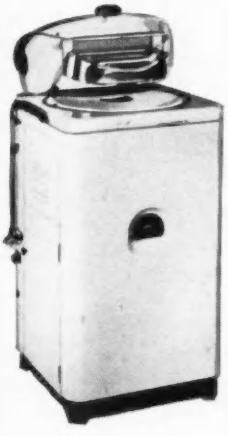
AN IMPOSING AFFAIR AT THE ASSEMBLY ROOMS

Gone are the days of the masque and the rout in the stately Assembly Rooms. But modern Assembly Rooms like this in the Parnall Factory at Yate are probably more useful. Here you see most women's favourite Electric Cooker, the Parnall, nearing completion. Only available for export just now — but here's hoping it won't be long before there'll be plenty for the housewives of the homeland.



The exceptionally handsome Parnall Electric Washer is the result of a careful survey of housewives' requirements. It handles a week's family laundry in one hour and among special features are the electric emptying pump, the very latest anti-corrosion treatment of metal parts and the storage recess for the Wringer.

Among the outstanding features of this EC 12 cooker are handsome appearance, rapid oven heating, drop-down balanced door, flush controls and a heated drawer in the plinth, if required.

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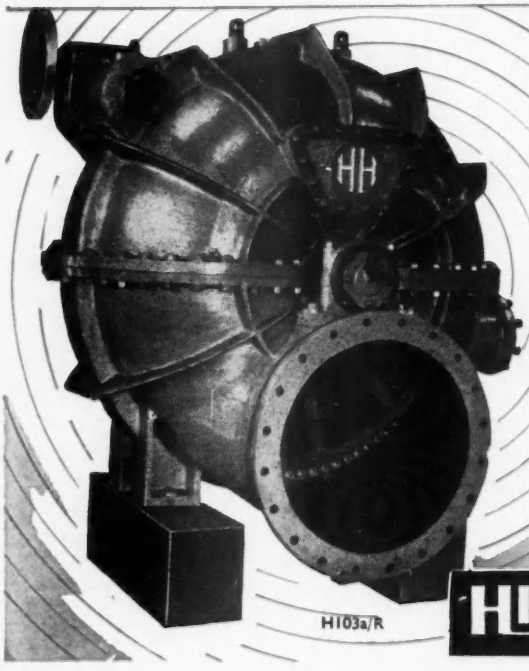
NETTLE ACCESSORIES Ltd.
HARPER ROAD WYTHENSHAWE MANCHESTER



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Gallons per hour

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